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Ontario Hydro
Environmental assessment
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"London Central"
Transformer Station

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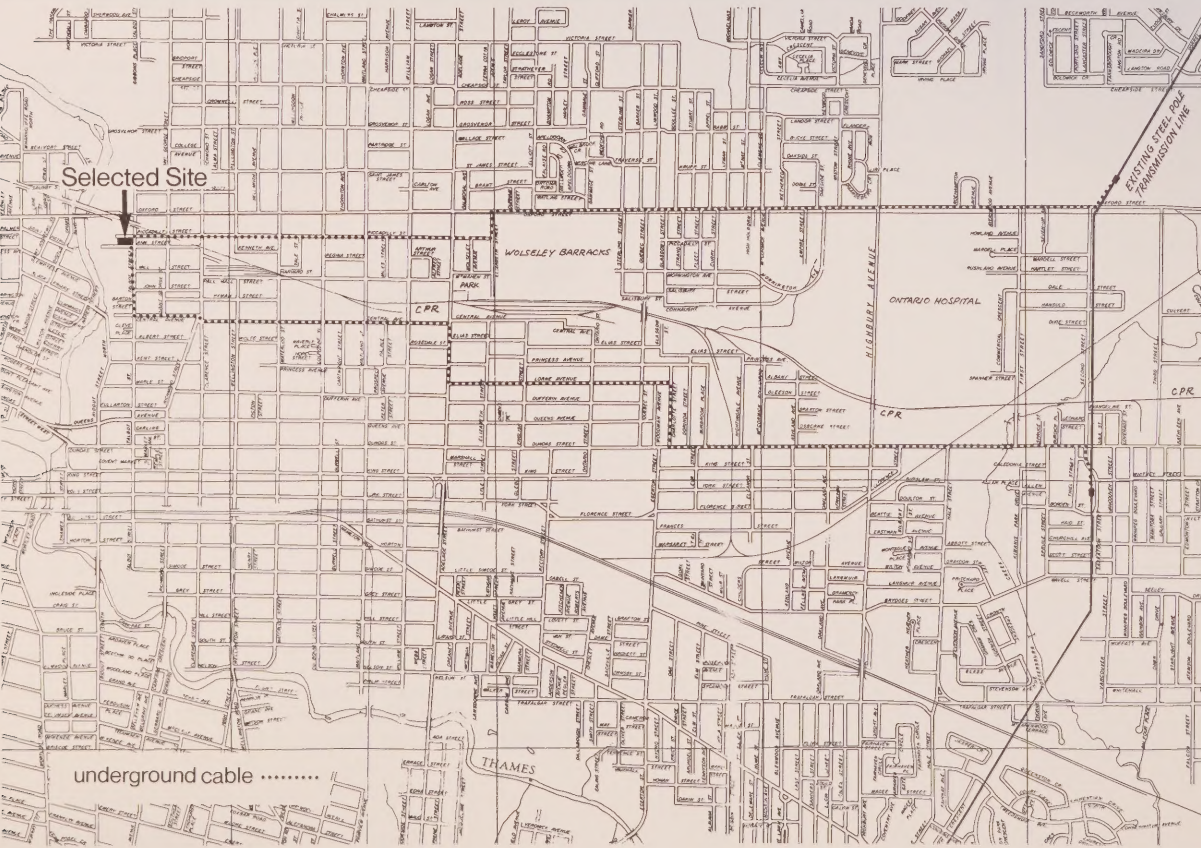
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Section 1
Proposal

- Ontario Hydro proposes to acquire property for and build the following facilities in the City of London as shown in Figure 1.
- (a) A 230-13.8-27.6 kV transformer station, in the central part of the city, on the west side of Talbot Street between Piccadilly and Ann Streets.
 - (b) Two 230 kV underground cables along city street allowances from the vicinity of Second Street in the east end of the city, to the proposed new transformer station on Talbot Street. The cable routes are subject to negotiation with the City of London.
- In addition, Ontario Hydro proposes to improve the appearance of, and reduce the sound level at the existing London-Nelson transformer station.

Figure 1 London Central Transformer Station— proposed site and possible 230 kV underground cable routes.



Section 2

Purpose of the undertaking

To provide adequate transformer station capacity to supply the growing electrical power needs of the City of London and to increase public acceptance of the existing London-Nelson transformer station.

Section 3

Rationale for the undertaking

3.1 GEOGRAPHICAL AREA OF CONCERN

The primary area of concern is the central part of the city. The northwest area is also of concern because of the difficulty of supplying this area in the future from existing transformer stations.

3.2 EXISTING SUPPLY FACILITIES

The electrical power requirements of the City of London and the surrounding area are supplied from Ontario Hydro transformer stations identified as London-Nelson TS, London-Highbury TS, London-Wonderland TS and London-Clarke TS, which are located as shown in Figure 2.

The central part of the city is supplied at 13,800 volts (13.8 kV), from 115-13.8 kV transformation at Nelson TS and Highbury TS. This area is identified by the larger shaded area on Figure 2. The area outside the central part of the city is supplied at 27,600 volts, (27.6 kV) from 115-27.6 kV transformation at Highbury TS and from 230-27.6 kV transformation at Wonderland TS and Clarke TS. The permissible maximum loads at these stations are shown in Table 1. The number of transmission circuits which supply these stations and their capabilities are given in Table 2.

Table 1 Capacity of transformer stations supplying London and area	
13.8 kV supply stations	Summer capacity*
Nelson TS	128 MVA
Highbury TS	31 MVA
Total	159 MVA
27.6 kV supply stations	Winter capacity*
Highbury TS	113 MVA
Wonderland TS	132 MVA
Clarke TS	117 MVA
Total	362 MVA

*The figures shown are based on the maximum allowable ten day emergency loading and include an operating margin of 7 MVA for Nelson TS and 5 MVA for each 27.6 kV station. No operating margin was allowed for the Highbury 13.8 kV station.

Figure 2 London's power system

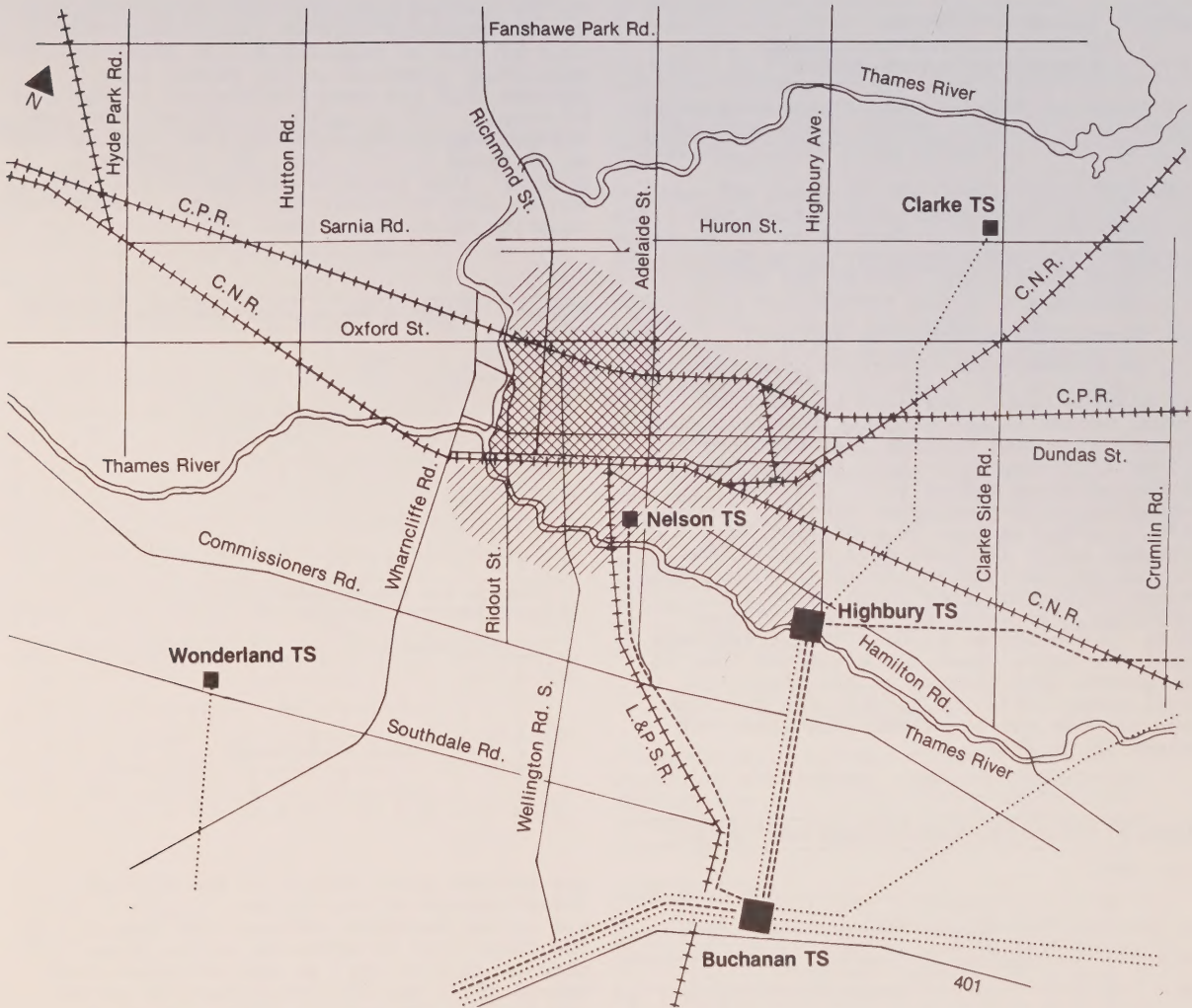


Table 2 Voltage and capacity of transmission lines supplying London transformer stations

Line to	Voltage of line	Number of circuits	Minimum capacity of each circuit in MVA
Nelson TS	115 kV	2	125
Highbury TS	115 kV	2	125
Wonderland TS	230 kV	2	360
Clarke TS	230 kV	2	600

3.3 POWER REQUIREMENTS AND ADEQUACY OF EXISTING FACILITIES

The maximum power demand on the 13.8 kV system occurs in the summer. Figure 3 shows the actual summer maximum load supplied by Nelson TS in the years 1969 through 1976, estimated loads beyond 1976, and the capability of the existing station. From 1976 to 1980 the load is estimated to increase at 4% per year plus an additional 10 MVA for new development in the downtown area. Beyond 1980, the upper curve shows the estimated load based on a 7% growth rate which is considered to be a "high" estimate. The lower curve shows the estimated load if the growth rate reverts to the historical 5% level after 1980. It can be seen that the load exceeds the practical load limit for Nelson TS in 1981.

Figure 3 Nelson TS—summer peak load (13.8 kV)

Load in MVA

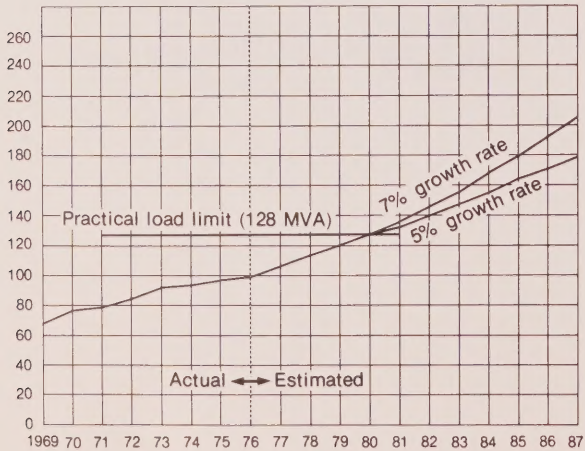
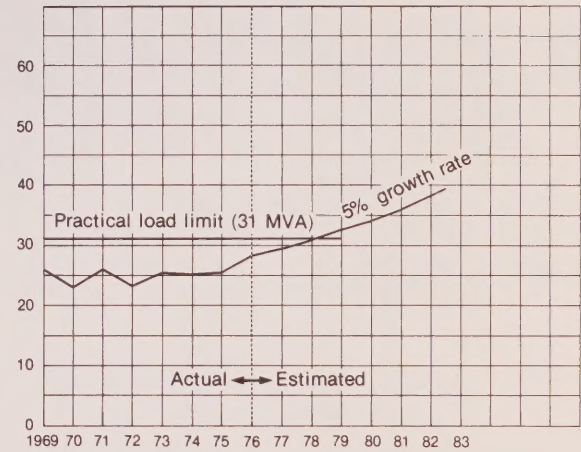


Figure 4 shows load and capacity information for the Highbury 13.8 kV facilities. The 13.8 kV load at Highbury TS has been relatively constant in the recent past because load has been transferred to the 27.6 kV supply. If no further transfers are made, the practical load limit for the station will be exceeded in 1979 for a 5% growth rate. However, load transfers to the 27.6 kV supply can be made to ensure that there is adequate capacity to at least 1981.

Figure 4 Highbury TS—summer peak load (13.8 kV)

Load in MVA



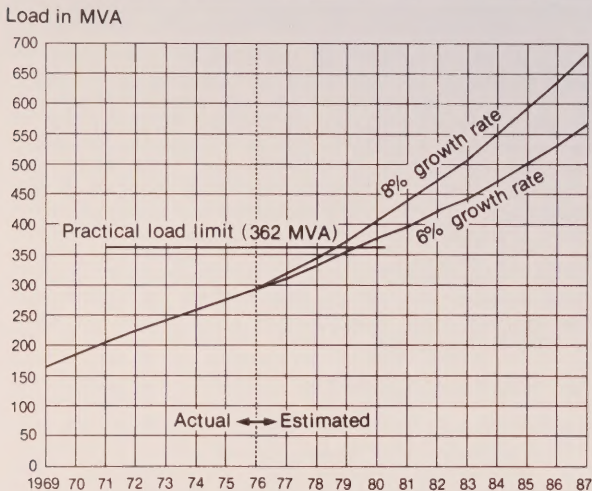
The maximum power demand on the 27.6 kV system occurs in the winter. Figure 5 shows the actual December maximum load supplied by the three 27.6 kV stations in the years 1969 through 1976 as well as the estimated load beyond 1976, and the total capacity of the stations at the present time. The upper curve for the estimated load beyond 1976 is based on an 8% growth rate which was the approximate growth rate for the 7 year period 1969-76. The lower curve shows the load if a growth rate of 6% is assumed. The practical 27.6 kV load limit would be exceeded in 1979 based on a continued 8% growth rate and in 1980 based on a 6% growth rate. The reason for using a "high" estimate as well as a more probable estimate for future loads is to ensure adequate lead time in the event that load growth is higher than expected. This permits studies to be made and property requirements to be established at an early date to meet the higher growth rate but

Section 4

Methods of providing adequate power supply

allows the actual construction of facilities to be deferred if the growth rate is lower than forecast.

Figure 5 December peak load for 27.6 kV transformer station



If no action were taken, the continued growth in electrical power requirements would result in a progressive degradation of service, an increase in the risk of damage to utility and customer equipment, and eventually the inability to supply power to all customers at a given time. The option of doing nothing, therefore, is not acceptable.

To meet the needs of the central part of the City, additional transformer capacity to supply power at 13.8 kV is required within the central area. To meet the needs of the area outside the central part of the City, additional transformer capacity supplying power at 27.6 kV is required. The requirements prior to 1981 and the requirements in 1981 are considered separately in the following two sections.

4.1 REQUIREMENTS PRIOR TO 1981

As indicated in section 3.3, remedial measures on the 13.8 kV system are not required until 1981. However, the practical load limit on the 27.6 kV system may be reached in 1979 or 1980. It is possible to install the required additional capacity on existing property at Wonderland TS or Clarke TS by replacing existing transformers or adding new ones.

4.2 ALTERNATIVE FACILITIES TO MEET 1981 REQUIREMENTS

Since the main concern of this study is supply to the central area, the following alternative ways of providing additional transformation for this area in 1981 were considered.

Alternatives

1. Add Capacity at Nelson TS, 115-13.8 kV
2. Add Capacity at Nelson TS, 230-13.8 kV
3. Add Capacity at Highbury TS
4. Build New Station

A brief discussion of each of the alternatives follows:

4.2.1 Alternatative 1: Add Capacity at Nelson TS, 115-13.8 kV

There are two choices:

- (a) Replace two existing transformers with larger units. In addition, London Public Utilities Commission (PUC) circuits which are located under the existing 115 kV line and which limit the power which can be transmitted over the

line because of inadequate clearance between the circuits would have to be relocated. This alternative would be adequate for approximately three years. It was proposed, early in this study, to implement this plan because the load forecast prepared in 1975 indicated that additional capacity was required in 1978. Because anticipated downtown development has not occurred and because further calculations have shown that the capability of Nelson TS is slightly higher than previously used, the existing facilities are now expected to be adequate to 1981.

- (b) Install additional transformers. This alternative would require additional property, including the removal of at least one house east of Nelson TS. A new transmission line from Buchanan TS would also be required and eventually more 230-115 kV transformer capacity would have to be installed at Buchanan TS unless the new line was operated at 230 kV.

4.2.2 Alternative 2: Add Capacity at Nelson TS, 230-13.8 kV

Supply to Nelson TS at 230 kV can be provided in the following three ways, all of which require additional property for the additional transformation:

- (a) Re-insulate the existing 115 kV line from Buchanan TS to operate at 230 kV if feasible. This would require rebuilding the existing station so that it could operate at 230 kV. For an open type station, additional property to the east as far as William Street would be required. For an indoor station, approximately 60 m (200 ft.) of property to the east, involving 5 houses would be required. The feasibility of changing the 115 kV line to 230 kV has not yet been established.
- (b) Build a new 230 kV overhead line and underground cable circuits from Buchanan TS. The cable section would be near Nelson TS where overhead 230 kV line is not feasible. This would permit the existing station to be retained and would require the property occupied by 1 or 2 houses to the east for an indoor station.
- (c) Build new 230 kV underground cable circuits from Highbury TS. The same comments as for (b) apply.

4.2.3 Alternative 3: Add Capacity at Highbury TS

This alternative is not practical because of the relatively long distance from Highbury TS to the downtown load area which would result in high costs for cables, increased power losses and voltage problems.

4.2.4 Alternative 4: Build a New Station

The new station should be within the heavy load portion of the 13.8 kV area since this is the area where most of the power is used. It should be supplied at 230 kV as this is the economic supply voltage in the area and best meets the long term needs. The nearest sources of 230 kV supply are the 230 kV lines from Buchanan TS to Clarke TS or Wonderland TS. A supply from Wonderland TS would have to be by means of underground cable since it is not practical to build an overhead line from Wonderland TS to the centre of the City. The supply from the Clarke line would be one of the following:

- (a) Overhead along the CP or CN railways
- (b) Overhead part way along the CP or CN railways and underground along city street allowances for the remainder of the distance.
- (c) Underground along city street allowances all the way.

Since an increase in 115 kV capacity at Nelson TS would be adequate for only three years, it was decided that the only practical long term alternative was to build new 230 kV facilities, with transformation located either on a new site adjacent to Nelson TS or on a new site elsewhere.

The initial 27.6 kV requirements can be met by increasing the transformer capacity at existing 27.6 kV stations. However, as power requirements increase in the northwest part of the city, it will become more difficult to supply this area from existing stations. A new station will therefore eventually be required in this area, possibly in the early or mid 1980's. The need for this station could be deferred, with a resulting saving in cost, if it were found practical to build a new station located so that it could supply both the 13.8 kV and 27.6 kV systems.

Section 5

System and environmental study

5.1 PUBLIC PARTICIPATION

5.1.1 Program Design

The central component of the public participation process was a Working Committee which included local residents. The formation and composition of the Committee is described in section 5.1.2. The process was designed to allow the Committee members to develop a detailed understanding of all aspects of the study. Members of the Committee were then responsible for passing on information to their constituent groups to ensure a good exchange of information and opinions throughout the study. It was expected that the Committee would provide consensus recommendations that would aid Ontario Hydro in making decisions that had broad public support. All Working Committee meetings were open to the public and the media, and minutes of the meetings were made available at City Hall.

To inform the wider public about the study and provide an opportunity for their questions and comments, the Working Committee sponsored a series of information centres in the areas affected twice during the study. These were advertised in the media and flyers were delivered to each home in the study area. Examples of the advertisements and flyers which were used are given in Appendix 1.

The media were invited to all information centres so that press coverage of key steps in the study would be encouraged.

In addition, a number of speaking engagements with interested groups and community associations were arranged to provide information concerning the study.

5.1.2 Formation of the Working Committee

In May of 1975, Ontario Hydro and London PUC made a joint presentation to the London City Council outlining the need to increase the electrical supply to the City. At the utilities' request, the Mayor had invited community leaders to attend the meeting. During the Council meeting it was suggested that a consultant should be hired to act on behalf of the City throughout the study. Subsequent to the meeting, Hydro met with the interested citizens and formed an ad-hoc committee. The committee echoed the request previously made at the Council meeting for a consultant, who would in their minds, be able to provide them with independent professional assistance as well as serve the City's

interests. With Hydro's agreement members of the Working Committee assisted in the selection of a consultant and Mrs. Kevin Garland, of A.J. Diamond Associates was engaged by the City.

The ad-hoc citizen's committee evolved into the London Hydro Working Committee which was comprised of the following:

Mr. Ken Buller, Ontario Hydro
Mr. Sandy McDermid, Ontario Hydro
Mr. Mike Krpan, Ontario Hydro

Mrs. Kevin Garland, City Planning Department (consultant)

Mr. Bob Swim, London PUC

Mrs. Ormah Gibson, Urban League of London

Mrs. Barbara Chapin, North London Community Association

Mr. Ted Gauci, Lorne Avenue Community Council

Mr. Paul Newall, North East Central London Community Association

Mrs. Mardelle Bishop, Pollution Probe London

Mr. Stuart Robb, London Chamber of Commerce

Mr. Dan Link, An interested citizen

Mr. Bruce Wright, Talbot Community Association

Mrs. Elaine Hagarty, An Alderman from the ward in which the study area was located.

5.1.3 Role of the Consultant

The following was the role of the consultant as agreed to by the citizens' group, Ontario Hydro, London PUC and the City of London. The Consultant was to:

- (a) Be responsible to the City Planning Department to ensure that any course of action being followed complies with the planning principles and expectations of the City.
- (b) Act as a professional resource to the citizens in any research or investigations related to the project.
- (c) Provide independent professional judgement throughout the study process to Ontario Hydro, the citizens, and the City.

- (d) Assist the Working Committee in the following work:

Review of the need

Identification of the study area

Identification and investigation of alternative plans

Evaluation of alternatives

Development of material for reports, presentations or hearings as required

Be available as resource person and/or witness at hearings, public meetings, etc.

5.1.4 Role and Activities of the Working Committee:

It was agreed that the Working Committee would provide recommendations to Ontario Hydro and would attempt to do so by consensus. Ontario Hydro would be ultimately responsible for making the necessary decisions. The Working Committee held 27 meetings from January, 1976 through to March 29, 1977.

The major work the Committee performed is summarized as follows:

- reviewed and agreed upon the need to increase the electrical supply facilities
- reviewed the possible system alternatives to meet the need
- agreed on a study area for a new central transformer station
- agreed on the need to increase the capacity of the Nelson and Clarke (or other 27.6 kV) transformer stations to meet the immediate need as necessary
- investigated the existing Nelson transformer station with Nelson area residents and recommended remedial measures to reduce sound levels and improve the appearance of the station
- agreed upon the need for a new centrally located transformer station to meet the longer term need

- developed criteria for identifying possible transformer station sites within the study area
- developed criteria to evaluate the sites identified and the associated transmission line alternatives
- discussed energy conservation and specifically the role the City could play in promoting conservation
- investigated the safety and health aspects of transformer stations and transmission lines
- sponsored five day-long public information centres to obtain public comment on the sites identified and the criteria by which they would be evaluated
- helped evaluate the site and transmission line alternatives
- sponsored two public information centres to obtain public comment on; 1) the recommended site for the new transformer station, and 2) two transmission line alternatives.

The item above concerning Nelson TS sound levels and appearance was given special attention by the Working Committee who met with local residents and came to the conclusion that existing conditions at the station should be improved. In particular, it considered that the measured sound level of 55 dBA at the station fence was too high and that the appearance of the station could be made more attractive. The Working Committee recommended the construction of a wood fence and the planting of trees to improve the appearance of the station by December 31, 1978. It also recommended that measures be taken to reduce the sound level at the fence line to less than 50 dBA no later than December 31, 1981. The actual recommendations are given in Appendix 2.

The item concerning conservation was also given special attention. The Working Committee expressed strong concern about the impact of transmission and transformation facilities on urban areas and on capital spending resulting from the steady rise in electric power consumption. Concern was further expressed about the mandate of both Ontario Hydro and the local utility to supply the power needs of new customers on demand. It was felt that a more rational use of resources could be achieved through a number

of measures taken at all levels of government. In particular, the Working Committee recommended that all development applications brought before the City be accompanied by a statement demonstrating that the efficient use of energy had been considered and that London PUC review these statements. The wording of the resolution is contained in Appendix 2.

The Working Committee reviewed health, safety and nuisance aspects of transmission lines and transformer stations. Appendix 3 provides a summary of the items considered for transformer stations. Information concerning overhead transmission lines has not been included as the final proposal did not include the construction of an overhead line.

The Working Committee recommendations concerning the proposed central transformer station and associated transmission facilities are outlined in the appropriate section of this report (Section 5.8.4) and are given in full in Appendix 2.

5.2 STUDY AREA FOR NEW STATION

The boundaries of the study area were strongly influenced by the electrical load centre of the core area of the city. Reasonable proximity to the load centre was necessary to minimize the low voltage feeder requirements, minimize transmission losses and provide improved voltage.

The study area was defined by the Thames River to the west, the CN railway to the south, approximately Adelaide Street to the east and approximately Oxford Street to the north. The study area is shown cross-hatched on Figure 2.

5.3 IDENTIFICATION OF POTENTIAL SITES

A positive approach utilizing identification guidelines was employed in identifying potential transformer station sites. The Working Committee developed the following characteristics as guidelines:

The potential sites should lie within the study area, and should be characterized by one of the following:

- (a) vacant land
- (b) land occupied by abandoned or unused buildings

- (c) land occupied by industry slated for possible relocation

Utilizing these guidelines, the City planning staff identified 15 potential sites for investigation by the Working Committee.

At the five day-long information centres mentioned in 5.1.4, seven additional locations were identified by the public as potential sites.

Based on the alternatives identified in section 4.2 a further site adjacent to the existing Nelson TS was included to provide for the alternative of adding capacity at that location. It was recognized that this site did not meet the site identification guidelines.

The total number of potential sites identified was 23. The locations of these sites are shown on Figure 6.

5.4 SITE AND LINE ROUTE EVALUATION CRITERIA

The Working Committee developed a list of criteria to be applied in evaluating the potential effects of any site or line route alternative. The criteria were divided into two categories.

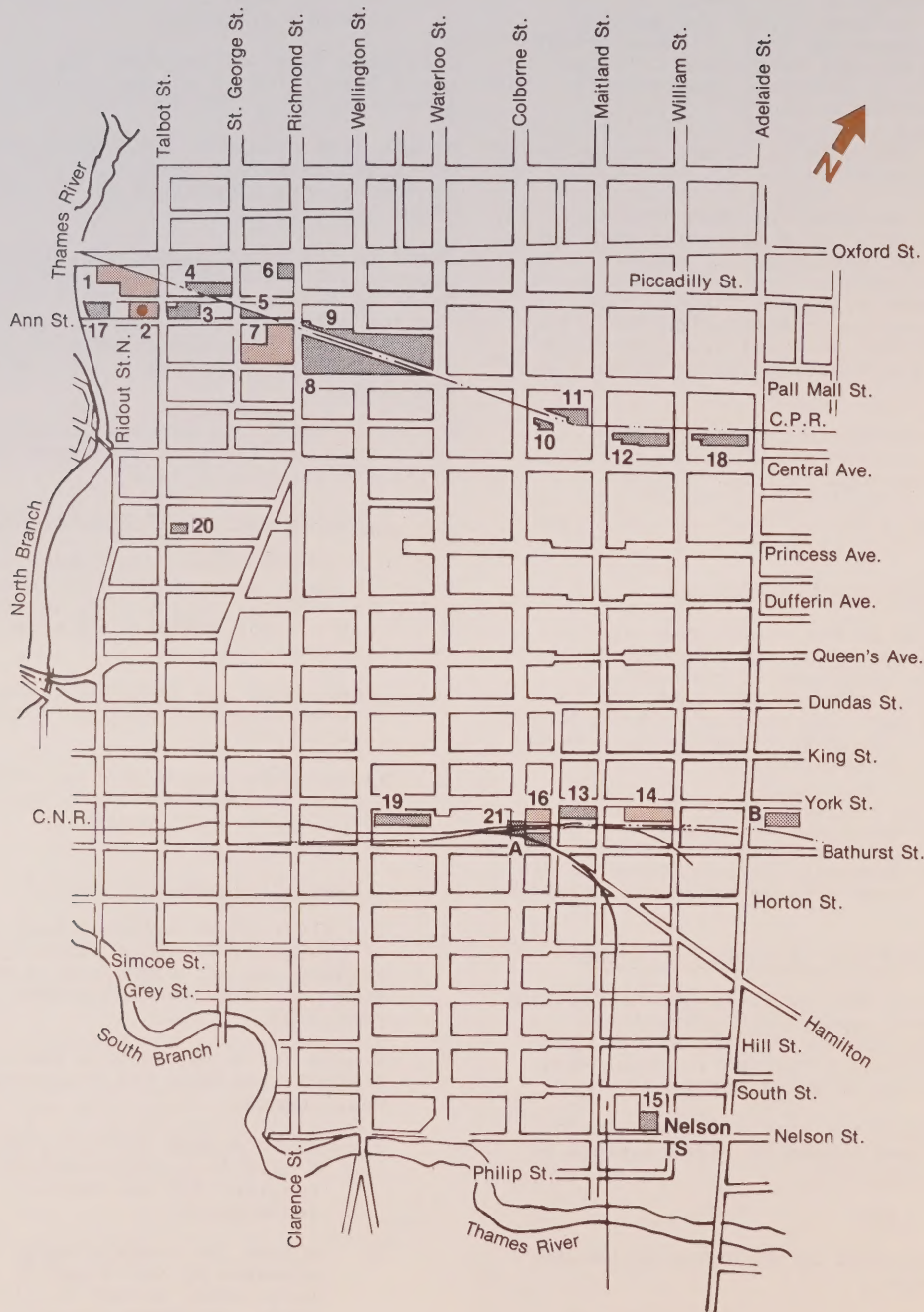
- (a) Those which are fixed planning constraints which must be met by all alternatives.
- (b) Those which vary from one location to another and which will be used in the identification of preferred alternatives.

5.4.1 Fixed Planning Constraints

- A. The alternative selected must be capable of providing adequate capacity by the required in service dates to meet the power needs of Central London up to the year 1985.
- B. A site for a new central transformer station must meet the following requirements:
 - 1. minimum size of 55 m (180 ft.) x 61 m (200 ft.), exclusive of any land required for set-back or landscaping;
 - 2. access for transformers, which is affected by the location of rail facilities, street loading requirements, overhead clearances, etc.;

Figure 6 Sites considered for new transformer station

-  Sites eliminated
-  Other sites evaluated in detail
-  Recommended site



3. access for both high voltage and low voltage lines
4. access to water and sewer services;
5. freedom from legal entanglements.

5.4.2 Site Specific Evaluation Criteria

The intent of the site specific evaluation criteria was to identify possible effects which should be considered in making a comparative evaluation of alternatives.

A. System Criteria

1. System reliability
2. Flexibility for future expansion of the system
3. Proximity to the load centre
4. Minimization of energy losses

B. Economic Criteria

1. Initial capital cost, which includes the cost of the following components
 - station
 - high voltage lines
 - low voltage lines
 - site acquisition
2. Long term costs which include the costs of the following components
 - facilities as in 1. above
 - facilities required for future expansion
 - operation and maintenance
 - transmission losses

C. Community Planning Criteria

1. Effect on residential areas including related residential uses such as schools, parks and churches;
2. Effect on industrial and commercial areas;
3. Effect on historic sites or areas;
4. Effect on property values;
5. Effect on community attitudes;
6. Compatibility with City of London planning policies;

7. Effect on potential of existing rail corridors for present and future multi-purpose uses;
8. Effect on potential for future development;
9. Effect on natural systems;
10. Site flexibility for building design;
11. Site flexibility for landscape treatment;
12. Effects related to construction;
13. Effects related to visual intrusion.

5.5 INVESTIGATION OF POTENTIAL TRANSFORMER STATION SITES

Each of the 23 sites identified in section 5.3 and shown on Figure 6 was investigated to determine if it conformed with the site identification guidelines and if it met the fixed planning constraints identified in the evaluation criteria. The sites which met these requirements were then evaluated by the application of the site specific evaluation criteria.

It was found that sites 4, 5, 6, 10, 17, 20 and 21 did not meet the minimum size requirements.

Sites 8, 9 and 12 were eliminated because of legal entanglements.

Sites 3, 11, 13 and 18 were eliminated because they contained active industrial or commercial enterprises not wanting to relocate.

Site A and B were eliminated because they were outside the study area.

The above eliminations reduced the number of sites requiring further investigation to 7, namely: 1, 2, 7, 14, 15, 16 and 19.

At this time the further consideration of site availability, that is, the willingness of the existing owner to have his property considered as a potential site was added to the selection process. In this regard site 19 was eliminated from further consideration in response to a statement from the owner, Canadian National Railways, that their property was definitely not available.

The Working Committee agreed that negotiations to secure options on the remaining sites should begin while applying the site evaluation criteria. An option was considered the only valid indication of site availability. Site 15 was excluded from further consideration because 1) it did not meet the site identification guidelines as homes would have to be removed, 2) any expansion would not comply with the zoning bylaw or the official plan, and 3) there were sufficient alternatives available to make it unnecessary to consider site 15 any further at this time.

The evaluations and site availability considerations are discussed in section 5.8.

5.6 TRANSMISSION LINE ALTERNATIVES

The five potential transformer station sites which remained after applying the site evaluation criteria were located in two distinct areas. Sites 1, 2 and 7 were in the northwest part of the study area, near the CP railway and sites 14 and 16 were in the south part of the study area, near the CN railway. The 230 kV supply to stations on these sites could be from the 230 kV line which supplies Wonderland TS or from the 230 kV line which supplies Clarke TS. The supply from Wonderland TS, which would have to be by means of underground cable, was eliminated from further consideration on the following basis:

- (a) Based on the shortest route along city streets, a cable supply from Wonderland TS would be 50% longer and more costly than a cable supply from the Clarke 230 kV line.
- (b) To meet the long term requirements of the northwest area of the city, as discussed later in section 5.7, the cable supply from Wonderland TS would have to follow a route which would make it much longer and much more costly initially than supply from the Clarke 230 kV line.
- (c) Supply from the Clarke 230 kV line afforded the possibility of using overhead 230 kV line for part of the distance along one of the railway rights-of-way which, if found to be practical, could result in savings of millions of dollars compared to underground cable.

5.6.1 Underground Supply

A transformer station on any of the five sites could be supplied from the 230 kV line to Clarke TS by means of underground cable. The supply would consist of two cable circuits so that power would not be interrupted when one circuit was out of service for maintenance or repairs. To ensure a high degree of reliability, the two cable circuits would be on separate routes wherever possible.

5.6.2 Overhead Supply

A standard lattice steel tower transmission line requires a right-of-way at least 33 m (110 ft.) wide and an area of 6 m (20 ft.) square for the tower base. If steel poles are used instead of towers, a 20 m (66 ft.) right-of-way is adequate and only an area 2 m (6 ft.) in diameter is taken up by the pole. The use of steel poles offers the possibility of utilizing a railway right-of-way for a transmission line since it may be possible to install the poles along one side of the right-of-way. As can be seen from Figure 1, sites in the north part of the study area afford the possibility of supply by means of an overhead line along the CP railway and sites in the south part could possibly be supplied by means of an overhead line along the CN railway.

Preliminary studies showed that there was physical space available along the north side of the CP railway to install a two circuit 230 kV steel pole transmission line for approximately 3.4 km (2.1 mi.) from the existing Clarke TS line to the vicinity of the Wolseley Barracks. Underground cable would have to be used for the remainder of the distance to sites 1, 2 or 7. The overhead line would require the agreement of CP Rail and ownership or easement on up to 10 m (33 ft.) of adjacent private property because the line would overhang this property, possibly including one building. An area of approximately 23 m x 30 m (75 ft. x 100 ft.) would be needed for termination purposes where the change from overhead to underground was made.

Preliminary studies also showed that there was physical space available to erect and maintain a two circuit 230 kV steel pole line along the north side of the CN railway from the existing Clarke TS line to the vicinity of Egerton Street, a distance of approximately 2.1 km (1.3 mi.). There was one area, however, which would require the purchase of or easement rights on 10 m (33

ft.) of private property and the overhanging of private buildings. Further, it was determined that property for the overhead to underground termination was not available along the line route except near Highbury Avenue. This would reduce the length of overhead line to approximately 0.8 km (0.5 mi.).

5.7 LONG TERM STATION AND TRANSMISSION REQUIREMENTS

As indicated earlier, there is a requirement for a new transformer station in central London as early as 1981. Additional facilities beyond 1981 will have to be provided as the power requirements of the City of London and surrounding area increase.

5.7.1 Long Term Station Requirements

The timing for additional transformer station

facilities will depend primarily on the rate of electrical load growth. The location where transformation should be provided will depend primarily on where the growth areas are. In section 3.3, two growth rates at each supply voltage (13.8 kV and 27.6 kV) were identified. The timing for additional transformation can be established by comparing the forecast load in each year with the available transformer capacity and adding transformation as required. There is some flexibility in timing, however, since rather than simply adding the largest practical size of transformer, it may be economic to replace existing smaller units. The additional transformation would normally be located in or close to the areas experiencing the greatest growth.

Figures 7 and 8 show two levels of load growth and possible capacity additions to meet this growth. Figure 7, for example,

Figure 7 Possible future load and transformer capacity (5% and 6% growth rates)

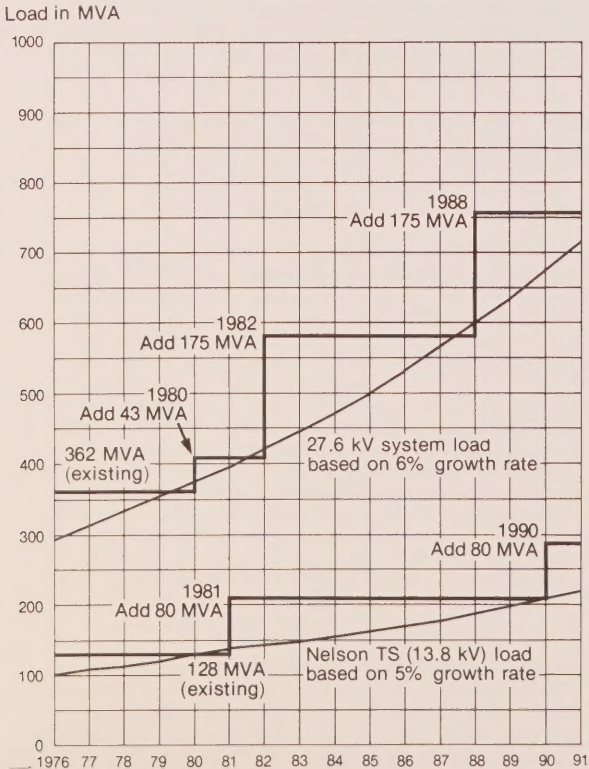
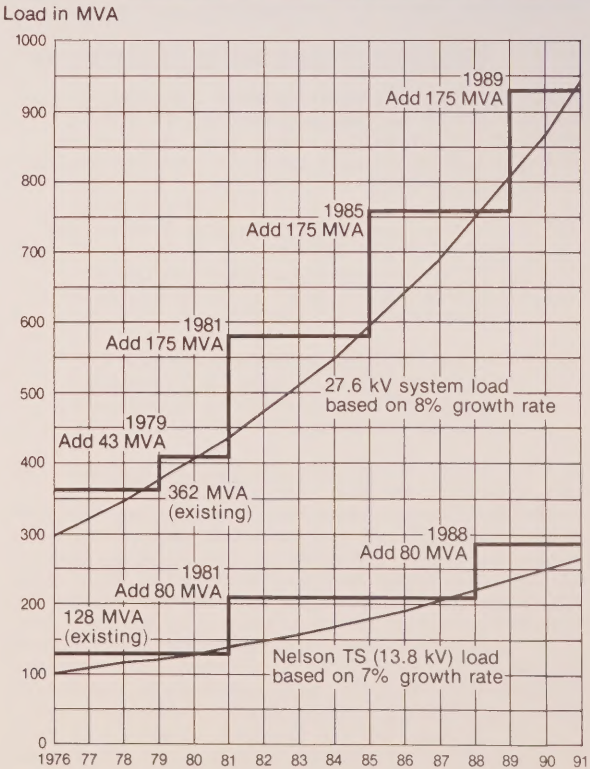


Figure 8 Possible future load and transformer capacity (7% and 8% growth rates)



shows that for 5% long term growth rate on the Nelson TS 13.8 kV system, additional capacity has to be provided in 1981 and 1990. Figure 8 shows that for a 7% long term growth rate these dates are 1981 and 1988. On the 27.6 kV system, additional capacity has to be provided in 1980, 1982 and 1988 for 6% growth rate, and 1979, 1981, 1985 and 1989 for an 8% growth rate. The 27.6 kV capacity additions assume that the initial step will be the replacement of existing transformers with larger units and that subsequent steps will involve the addition of new transformers.

A significant consideration in the addition of future transformation is the need for a 27.6 kV transformer station in the northwest part of the city. At the present time there are 27.6 kV stations in the southwest, southeast and northeast. The northwest area is experiencing growth, and as the power requirements increase, it will become more difficult and costly to supply this area from the existing stations. If it is practical to install 27.6 kV transformation at the proposed new station in the central part of the city, the need for a new station in the northwest could be deferred.

5.7.2 Long Term Transmission Requirements

Additional transmission line facilities beyond those needed initially for a new station in central London will have to be provided when one or more of the following conditions occur:

- (a) The existing transmission facilities become fully loaded.
- (b) A new station requiring additional transmission is needed.
- (c) The reliability of the existing transmission warrants improvement because of the increased number of customers supplied from it.

The existing transmission facilities provide two circuits to each transformer station. Each circuit is capable of supplying the entire load. This makes it possible to maintain supply to the entire load if one circuit fails or has to be removed from service for maintenance. When the load reaches the emergency capability of one circuit, additional transmission is required. Depending on the rate of load growth and system development, this condition could occur in London in the early 1980's.

For transformer stations which are connected

to a two circuit transmission line which can be supplied from only one end, a failure of a tower in the line would result in a complete interruption of power to the stations. If a large number of customers are involved, the provision of an alternate supply may be justified. Experience has shown that backup facilities to cover the case of a two circuit line failure may be justified when the load on the line in question reaches 250 MW. This could occur in London in the early 1980's.

Two possible future methods of providing an alternate supply to a new central London transformer station which is supplied initially from the Clarke TS line in the east are as follows:

- (a) The transmission lines which supply Wonderland TS could be extended to the new central station to complete a loop through the city.
- (b) If it is decided, as a result of a separate study concerning 500 kV transmission facilities in southwestern Ontario, to locate 500-230 kV facilities to the west of London, a 230 kV transmission line could be provided from this station to the new central London station.

The possible 1981 and future transmission line requirements in London, therefore, are as follows:

1981

Build 230 kV transmission facilities from the existing 230 kV line (to Clarke TS) in the east end of the city to a new station in central London.

Beyond 1981

Build 230 kV transmission facilities from the new central station westward to close the loop with Wonderland TS or to connect to a possible new 500-230 kV station west of the city. The transmission line running west from the central station should be routed through the northwest part of the city so that it can be used to supply a future transformer station in the northwest area.

5.8 EVALUATION OF ALTERNATIVES

Sites 1, 2 and 7 in the north part of the study area and sites 14 and 16 in the south part of the study area require the development of two significantly different transmission systems. Site 2 in the north

and site 16 in the south were selected as representative sites for use in evaluating the system and economic implications of the two areas. All five sites were considered when evaluating community planning factors.

5.8.1 System Considerations

The variables to be considered when comparing systems based on sites 2 and 16 were identified to be the following:

- (a) The transmission system could be all underground cable or part underground cable and part overhead line. A system based on all overhead line was judged to be impossible in light of the built-up nature of the central area.
- (b) The timing for transmission facilities which would be required in the long term could be affected by changes in reliability standards. Systems based on the following two reliability levels were therefore studied.
 - i) Normal backup, which provides an alternate supply when the total load interrupted for a two-circuit failure exceeds 250 MW.
 - ii) No backup for a two circuit failure, in which case an alternate supply is not provided until the emergency load capability of one circuit is reached.
- (c) Transformation stepping down to 27.6 kV could be considered for site 2 but was not practical at site 16 because the former site was near the 27.6 kV northwest area which required additional supply while the latter was isolated within the 13.8 kV area.
- (d) The location of future transmission lines could be influenced by the location of a future 500-230 kV station which is to be located in the London area. Systems based on the following two alternatives were therefore studied:
 - i) Wonderland loop, which provided an alternate supply from Wonderland T.S.
 - ii) 500 kV TS loop, which provided an alternate supply from an assumed 500-230 kV TS west of London.

- (e) The timing and possibly the location of the future Northwest TS would be influenced by whether or not 27.6 kV transformation was provided at the new Central TS.

Four underground cable transmission systems which were considered are shown in Figures 9, 10, 11 and 12. Equivalent systems which used overhead line wherever it appeared feasible to do so were also evaluated.

1. System Reliability

The reliability of the transmission system was considered high for all alternatives. However, a transformer station at site 2 was considered to provide a higher degree of reliability to the central area than a station at site 16. With a station at site 2, the central area would have a supply from the north as well as the existing supply from the south. A station on site 16 would only provide a second supply from the south.

If 27.6 kV facilities were installed at site 2, the reliability of supply to the northwest area would be improved.

2. Flexibility for Future Expansion

Site 2 provides greater flexibility than site 16 for the following reasons:

- (a) It is suitable for the installation of 27.6 kV facilities as well as 13.8 kV facilities.
- (b) It permits a greater diversity of 13.8 kV cable routes because there is no competition for space with cables from Nelson TS.
- (c) The area west of site 2 is less congested which will likely make it less difficult to extend 230 kV cable facilities to the west in the future.

3. Proximity to Load Centre

The electrical load centre of the 13.8 kV area is near Queens Avenue and Wellington Street. Site 16 is closer to the load centre than site 2 but it is located between the existing supply station, Nelson TS, and the load centre. Site 2 is considered to be better located with respect to the load centre than site 16 in this case because the resulting system has supply sources to the north and south of the load centre rather than two supply sources to the south.

Figure 9 Transmission loop via Wonderland TS

Possible long-term underground 230 kV cable system for Central TS on site 2



Figure 10 Transmission loop via 500-230 kV TS

Possible long-term underground 230 kV cable system for Central TS on site 2



Figure 11 Transmission loop via Wonderland TS

Possible long-term underground 230 kV
cable system for Central TS on site 16



Figure 12 Transmission loop via 500-230 kV TS

Possible long-term underground 230 kV cable system for Central TS on site 16



4. Minimization of Energy Losses

Energy losses on the 13.8 kV system would initially be higher for site 2 than for site 16. If redevelopment of the core area continues northward, the long term 13.8 kV system energy losses may be comparable. If 27.6 kV transformation is installed at site 2, energy losses on the 27.6 kV system would be much less than if supply had to be maintained from existing 27.6 kV stations.

5.8.2 Economic Considerations

Economic studies were carried out which took into account the variables and systems which are described in section 5.8.1. The studies assumed that the capacity of Nelson TS would be increased in 1978 and that other work would be carried out as was indicated by the load forecast in use in 1976 when the studies were carried out. A subsequent review, using revised loads and costs did not change the conclusions of the original study.

The results of the studies, taking into account Ontario Hydro costs only, are shown in Tables 3 and 4. London PUC costs and the conclusions reached from the study are given in the following sections:

1. Initial Capital Costs

The first year capital expenditures by Ontario Hydro are estimated to be \$480,000 to \$2,800,000 more for the site 2 system than for the site 16 system for overhead-underground and all underground supplies respectively.

The first year costs to London PUC are estimated to be \$2,215,000 less for site 2 than for site 16 if 27.6 kV is provided at site 2 and \$1,375,000 less than for site 16 if 27.6 kV is not provided at site 2.

The combined Ontario Hydro-London PUC first year costs, therefore, can range from \$1,425,000 in favour of site 16 for the all

Table 3 Approximate Ontario Hydro initial Capital Costs

	Site 2 has lower first cost by	Site 16 has lower first cost by
		First year cost only
All underground cable supply		
Without 27.6 kV at Central		\$2,800,000
With 27.6 kV at Site 2		2,800,000
Overhead and underground cable supply		
Without 27.6 kV at Central		480,000
With 27.6 kV at Site 2		480,000
	Normal backup case*	
	First two years costs	
Wonderland Loop		
All underground cable supply		
Without 27.6 kV at Central	\$1,000,000	
With 27.6 kV at Site 2	1,800,000	
Overhead and underground cable supply		
Without 27.6 kV at Central	200,000	
With 27.6 kV at Site 2	965,000	
500 kV TS Loop		
All underground cable supply		
Without 27.6 kV at Central	1,000,000	
With 27.6 kV at Central	1,800,000	
Overhead and underground cable supply		
Without 27.6 kV at Central	4,800,000	
With 27.6 kV at Central	5,500,000	

*If the "No backup for 2-circuit failure" case is considered, Site 2 costs would not be lower until four years after the initial installation.

underground cable case to \$1,735,000 in favour of site 2 in the overhead and underground supply case with 27.6 kV facilities at site 2. It should be noted from Table 3 that site 2 could have a lower cost in all cases in 2 to 4 years if back-up supply were provided within that time.

2. Long Term Costs

The conclusions which can be reached from the Ontario Hydro long term capital costs shown in Table 4 are as follows:

- (a) For all underground cable supply, Site 2 is favoured in most cases and may be economic in all cases except one. The

costs range from \$700,000 in favour of site 16 to \$2,300,000 in favour of site 2.

- (b) For overhead and underground cable supply, site 2 is lower in cost in all cases by amounts ranging from \$1,800,000 to \$5,500,000.
- (c) The alternatives which provide 27.6 kV at site 2 are more economic than the alternatives which do not if a common location for Northwest TS is assumed in all cases.
- (d) Alternatives based on overhead and underground cable supply are more

Table 4 Approximate Ontario Hydro long-term Capital Costs

	Site 2 System lower in cost by	Site 16 System lower in cost by
1. All underground cable supply		
1.1 Normal backup		
1.1.1 Without 27.6 kV at Central Wonderland loop 500 kV TS loop	\$1,000,000 1,000,000	
1.1.2 With 27.6 kV at Site 2 Wonderland loop 500 kV TS loop	2,100,000 or 1,800,000	\$700,000*
1.2 No backup for 2-circuit failure		
1.2.1 Without 27.6 kV at Central Wonderland loop 500 kV TS loop	500,000	300,000
1.2.2 With 27.6 kV at Site 2 Wonderland loop 500 kV TS loop	2,300,000 or 1,500,000	470,000*
2. Overhead and underground cable supply		
2.1 Normal backup		
2.1.1 Without 27.6 kV at Central Wonderland loop 500 kV TS loop	\$1,800,000 4,800,000	
2.1.2 With 27.6 kV at Site 2 Wonderland loop 500 kV TS loop	1,800,000 5,500,000	
2.2 No backup for 2-circuit failure		
2.2.1 Without 27.6 kV at Central Wonderland loop 500 kV TS loop	2,000,000 2,700,000	
2.2.2 With 27.6 kV at Site 2 Wonderland loop 500 kV TS loop	2,300,000 3,900,000	

*Site 16 system is lower in cost if Northwest TS is assumed to be near Hyde Park Road. If Northwest TS is assumed to be near Hutton Road, which is more probable for this alternative, then the Site 2 system is lower in cost.

economic than alternatives based on all underground supply.

- (e) If a 500-230 kV TS is located west of London, a back-up supply from this station may be more economic than back-up supply from Wonderland TS.

London PUC long term capital costs were estimated to be from \$1,375,000 to \$3,475,000 less for site 2 than for site 16. The higher figure applies if 27.6 kV facilities are provided at site 2.

Operating and maintenance costs were not calculated for these alternatives. The operating costs are comparable for the alternatives considered. The maintenance costs are quite different for overhead line and underground cable but the effect on the study is minimal. For example, the total amount of new overhead 230 kV line within the city in the site 2 overhead-underground system is 8.2 km (5.1 mi.). The annual maintenance cost for this line would be approximately \$3,500. The annual maintenance cost for the same length of underground cable would be approximately \$18,000. The difference of \$ 14,500 /yr. is not significant to the study.

Based on the foregoing, it was concluded that a transformer station on site 2, supplied by a combined overhead line-underground cable was the most economic choice.

5.8.3 Community Considerations

An inventory of the characteristics of five sites, Nos. 1, 2, 7, 14 and 16, is given in Table 5. The following observations can be made from this table:

- (a) None of the sites are residential in character, although the area immediately south of site 7 is residential. There is a seven storey apartment building one-half block south of site 2 which has a view of site 2.
- (b) Sites 1, 2 and 7 are the only sites supporting mature tree growth.
- (c) All of the sites can accommodate a new building without major change. A transformer station, however, would be higher than most of the development surrounding the sites.

Investigation also showed that a transformer station is a permitted use under existing zoning by-laws for all sites in question.

Table 5 Inventory of site characteristics

Site number	Existing character	Vegetation
1	Light industry	Some mature maple with supportative shrubby growth
2	Light industry	Row of poplar on northern half of western boundary; row of chinese elm on western half of northern boundary
7	Vacant lot	Mature maples along south side; scattered trees on site
14	Light industry	Some scrub
16	Commercial/ parking lot	None

The Working Committee evaluated the five sites by applying the community planning criteria given in Section 5.4.2. The evaluation was carried out by noting whether the potential effect was positive, negative, or nil. The results of this evaluation are summarized in Table 6. The surrounding land uses for each site are shown on Figures 13, 14, 15, 16 and 17.

North	Surrounding development		West	Overlooking apartments	Comments
South	East				
Railway right-of-way	Light industry	Vacant lot	Light industry	None	Railway embankment 15-20ft.
Light industry	Light industry	Light industry	Light industry	Seven storey building half a block south; some other buildings between this building and site #2	Land drops off to the west (toward the river) 10 foot ± retaining wall at west end of site
Light industry/residential	Residential	Commercial/light industry	Residential	None	Some old remains of foundations
Commercial/light industry	Commercial/light industry	Commercial/light industry	Commercial/light industry	None	
Commercial/light industry	Railway, then vacant lot, then residential	Commercial/light industry	Light industry	None	

Table 6 Summary of comparison of sites based on community planning factors

Community planning factors	Sites				
	1	2	7	14	16
1. Effect on residential areas including schools, parks and churches, etc.;	0	0	-	0	0
2. Effect on industrial and commercial areas;	-	-	0	-	-
3. Effect on historic sites or areas;	0	0	0	0	0
4. Effect on property values;	0	0	0	0	0
5. Effect on community attitudes;	+	+	+	+	+
6. Compatibility with London planning policies;	+	+	+	+	+
7. Effect on potential of existing rail corridors for multiple uses;	?	0	0	0	0
8. Effect on potential for future development;	-	-	-	+	-
9. Effect on natural systems;	0	0	-	0	0
10. Site flexibility for building design and landscaping;	+	-	+	-	-
11. Effects during construction	-	-	-	-	-

Footnote:

Sites were comparatively evaluated in terms of positive (+), negative (-) and zero (0) effect.

Figure 13 Surrounding land use, Site 1

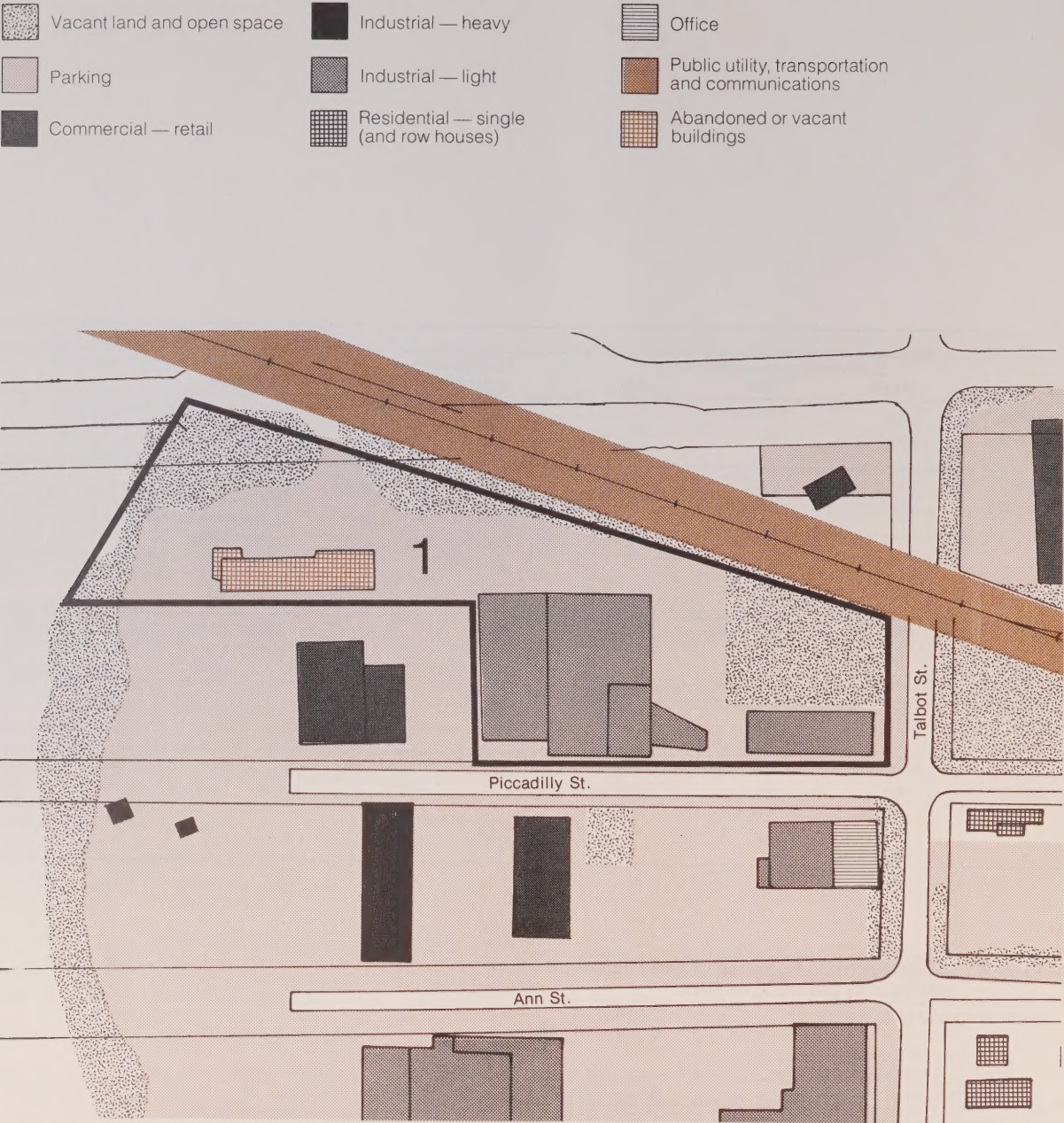


Figure 14 Surrounding land use, Site 2

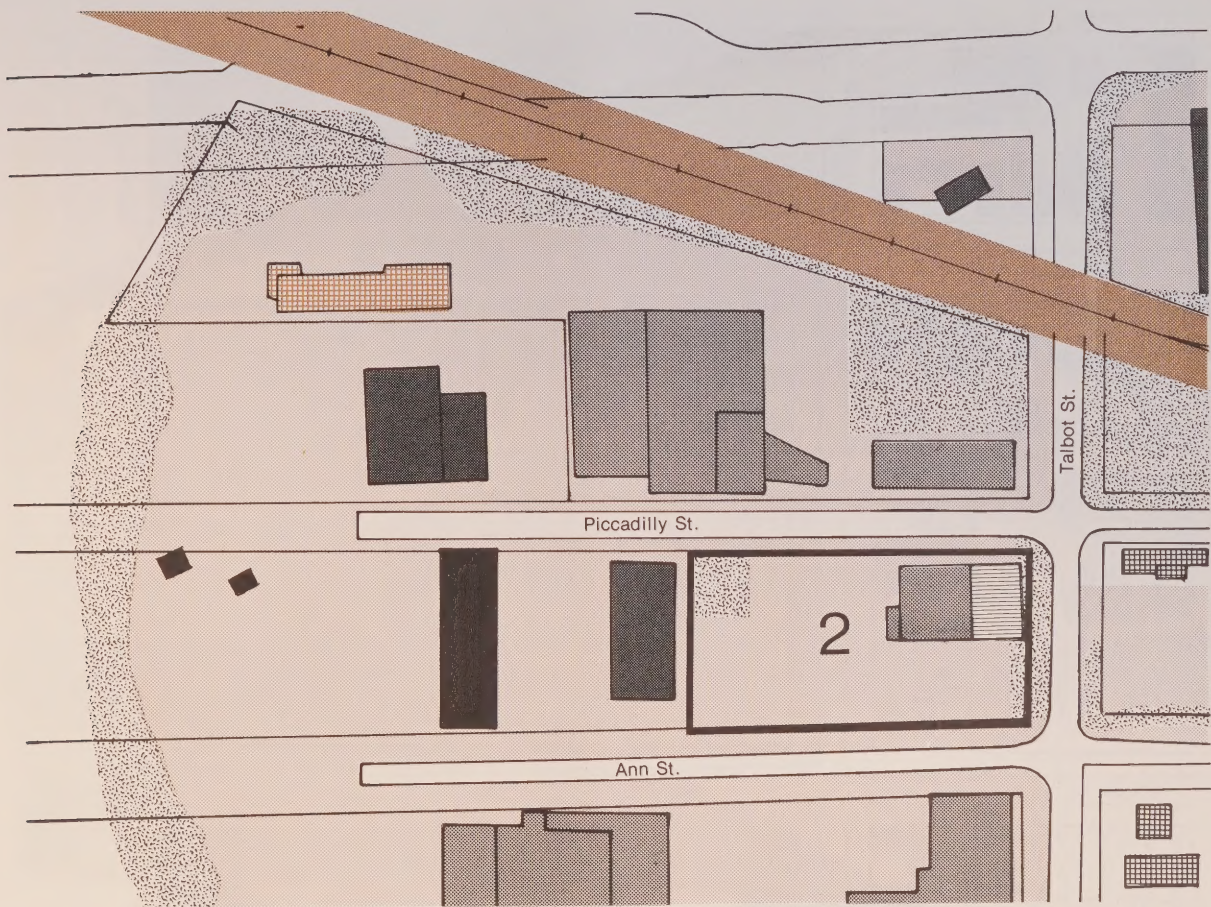
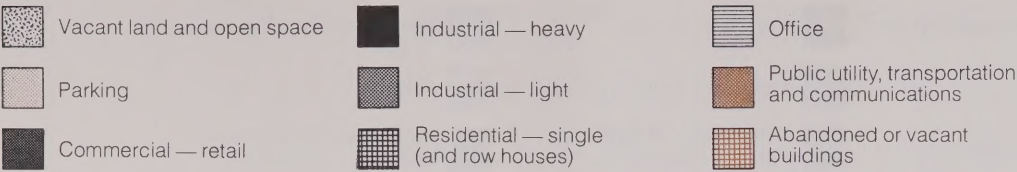


Figure 15 Surrounding land use, Site 7

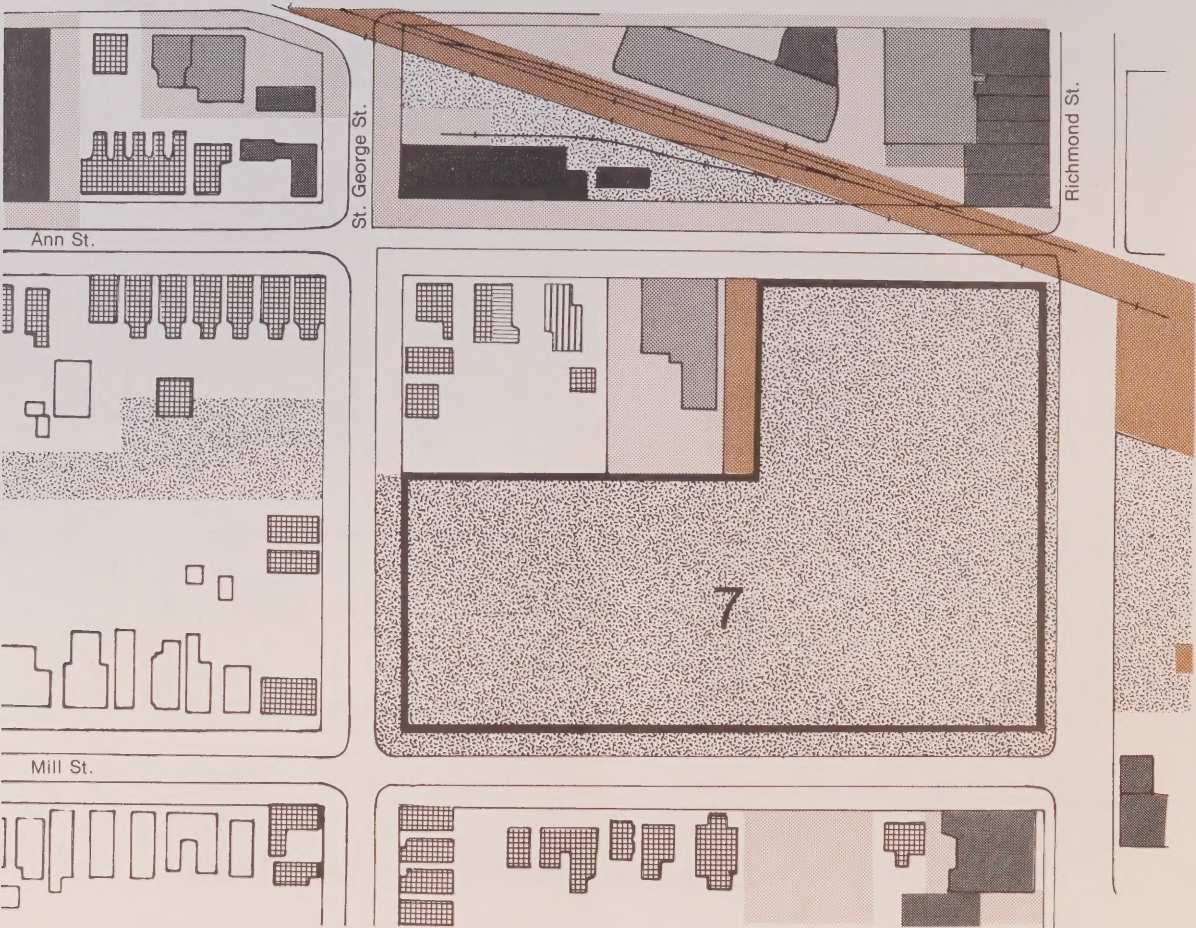
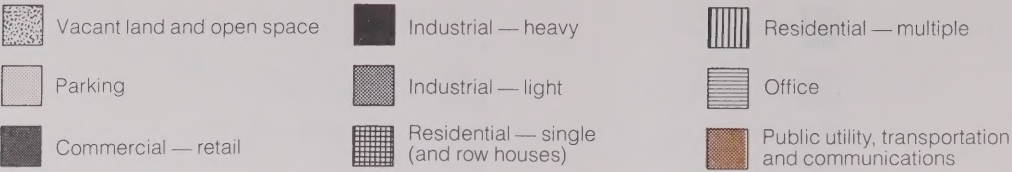
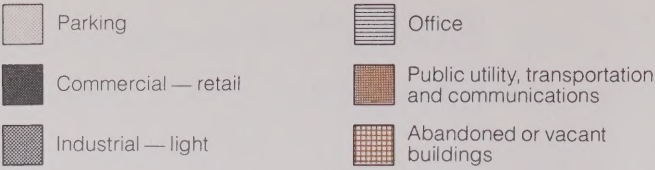


Figure 16 Surrounding land use, Site 14



Figure 17 Surrounding land use, Site 16



5.8.4 Site Availability and Other Considerations

As indicated in section 5.5, it was decided to attempt to secure options on sites 1, 2, 7, 14 and 16 to establish whether these sites were in fact available. These efforts indicated that sites 2 and 14 were the only sites for which options could be negotiated at a suitable price and within an acceptable length of time. Site 2 was selected as the preferred site on the following basis:

- (a) It was preferable from the system standpoint.
- (b) It was preferable from the economic standpoint, particularly if a combined overhead-underground supply were possible.
- (c) It was acceptable from a community standpoint.
- (d) It was available at a lower cost than site 14.

An option was negotiated for site 2 and Public Information Centres were held to obtain comments on this choice of site and on the following two transmission line alternatives.

Overhead and Underground Alternative

This alternative provided an overhead line along the north side of the CP railway from Second Street to the vicinity of Wolseley Barracks, and underground cable for the remainder of the distance to the transformer station site. A preliminary estimate of the cost, at 1976 prices, was \$5,500,000.

All Underground Alternative

This alternative provided underground cable for the entire distance from Second Street to the transformer station site. A preliminary estimate of the cost, at 1976 prices, was \$10,500,000.

A preliminary estimate of the cost of the transformer station was \$15,000,000 (1976 dollars).

The public information centres indicated acceptance by the majority of the public of site 2 and the combined overhead-underground transmission alternative. Taking into account the public reaction and based on its studies and the proposed measures to reduce

impacts given in a subsequent section (5.10), the Working Committee recommended that the alternative based on site 2 and combined overhead-underground transmission facilities be pursued. The Working Committee recommendations are given in Appendix 2.

The feasibility of physically locating an overhead line along the CP railway was established in earlier studies. Work was now initiated to determine whether agreements could be reached with the affected property owners. The negotiations with property owners resulted in the length of overhead line, and consequently the savings being substantially reduced, and finally revealed difficulties which made it highly improbable that the required in-service date for the facilities could be met. It was therefore decided by Ontario Hydro to adopt the all-underground alternative.

5.9 PROPOSED COURSE OF ACTION

As a result of the foregoing studies and Working Committee recommendations, Ontario Hydro proposes:

(a) At London-Nelson Transformer Station

- i) To provide improvements to the appearance of London-Nelson TS to be implemented not later than December 31, 1978.
- ii) To provide acoustical treatment of London-Nelson TS to reduce the level of sound originating from the transformers and measured at the station property line to below 50 dBA. The timing for implementing this treatment is dependent on the need to upgrade the station capacity, but in any event, the work is to be carried out no later than December 31, 1981.

(b) For Proposed New "London Central" Transformer Station

To acquire property and build a transformer station on the west side of Talbot Street, between Piccadilly and Ann Streets, to supply electric power to the central area of the city at 13,800 V and the northwest area of the city at 27,600 V.

(c) For Proposed Underground Cable Circuits to Supply "London Central" Transformer Station

To acquire property where necessary and build

two separate 230,000 V underground cables along City road allowances, from an existing transmission line near Second Street, to the proposed transformer station on Talbot Street.

5.10 PROPOSED WORK AND MEASURES TO REDUCE IMPACTS

5.10.1 London-Nelson Transformer Station

The surrounding land use at London-Nelson TS is shown in Figure 18. The improvements to the appearance of the station are to consist of an attractive board fence on the north, east and south sides, and plantings as shown in Figure 19.

The acoustical treatment of London-Nelson TS will consist of the replacement of four of the six existing transformers with two quieter transformers, or the installation of sound barriers, depending whether it is necessary to upgrade the capacity of the station before 1981.

Ontario Hydro has made a commitment to the City of London to enter into a site development agreement concerning the above work.

5.10.2 Proposed "London Central" Transformer Station

The following are basic facts concerning the transformer station and its construction:

Size of Building: Approximately 87 m (285 ft.) long x 33 m (107 ft.) wide x 14 m (45 ft.) high. The building will be only 60 m (195 ft.) long initially and will be extended to its full length in the future. The proposed arrangement for the maximum facilities is shown in Figure 20. Elevation drawings of the proposed station are shown in Figure 21.

Equipment in Building: Transformers, switches, circuit breakers and control equipment as well as 230 kV underground cable terminations.

Construction Activity: Will include the erection of a wood construction fence, excavation, concrete pouring, steel erection, building construction and movement of heavy equipment into the building.

Construction Period: Approximately 21 months including 12 months for outside work and 9 months for installing equipment in the building.

The following are measures which are to be taken to reduce the impact of the station on the community:

Construction will be carried out in the daytime and will not start earlier than 8:00 a.m.

The station will be designed so that the transformer hum outside the station will be less than the night-time ambient noise level.

The station will receive architectural and landscaping treatment as agreed with the City of London. The landscaping treatment will be equal in quality to the conceptual landscape design shown in Figure 22.

Ontario Hydro has made a commitment to the City of London to enter into a site development agreement prior to the construction of the station.

5.10.3 Proposed Underground Cable to Supply "London Central" Transformer Station

The following is information concerning a typical underground cable installation of the type to be used in London.

Number of cables: two, on separate routes

Type of cable: pipe type, oil filled

Size of cable: cable (three cores, one per phase) is inside 200 mm (8 in.) diameter, 6.3 mm (¼ in.) thick steel pipe.

Depth of burial: approximately 1., 6 in.). A typical cross section of a cable installation is shown in Figure 23. A separate oil return line which is not shown may be installed in the same trench.

Pumping plant: maintains oil pressure of 1.4 MPa (200 psi) in the cable and is located at the transformer station.

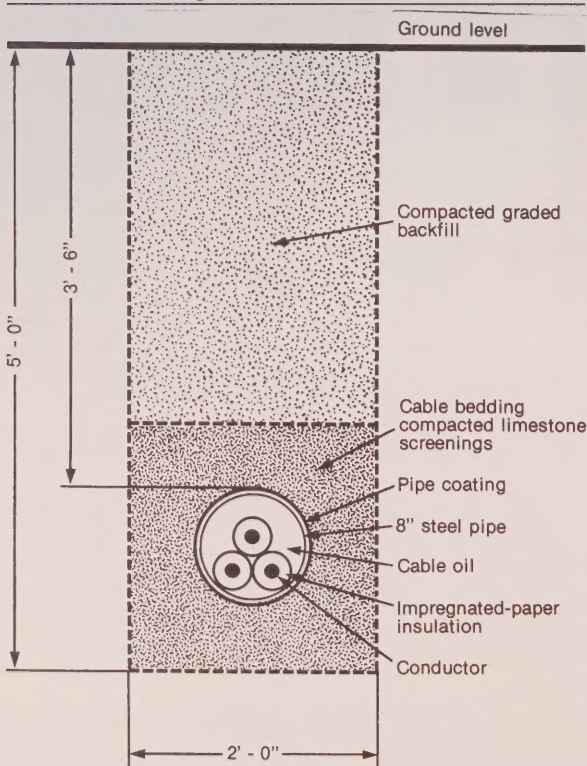
Construction: Excavate 75-100 m (several hundred feet) of trench within a street allowance and remove material to a designated site. The trench would be similar to one that would be required for a water main. Deliver, weld, test, radiograph and install pipe in bedding of limestone screenings. Backfill trench and restore surface to permanent condition. Excavate another

Figure 18 Surrounding land use, Nelson TS



several hundred feet and repeat. Reinforced concrete manholes, flush with the ground, are required approximately every 600 m (2000 feet). Time taken for each section is about 2 to 3 weeks; for entire job, about one year. When all pipe is installed, it is pressure tested and cable is pulled into pipe at manholes using winches. Cables are spliced, oil is introduced and cable is tested before being put into service.

Figure 23 Typical cross section— 230 kV pipe type underground cable



The following are measures which are to be taken to minimize the impact of the cable installation:

The steel pipe required for the cable will be installed in sections of 75-100 m (several hundred feet) to minimize the length of time that traffic will be impeded. The installation of the pipe will be carried out to minimize the disturbance to trees. The

termination areas for the cables will be screened where appropriate. Negotiations will be carried out between Ontario Hydro, the City Engineer and other utilities with underground installations to determine which city road allowances are best suited for the underground cables.

5.11 OPERATION AND MAINTENANCE

The proposed "Central" transformer station will be remotely controlled, probably from the Buchanan transformer station. However, it will be visited on a regular basis by a travelling operator.

Normal maintenance at the station will be carried out by several men who would arrive by automobile. Overhauls of equipment are required every 2 or 3 years which will require a larger crew and the use of a small van. The work would be carried out within the building. In case of a major equipment failure, a larger number of men and heavy equipment would be required for one or two weeks.

Maintenance of the underground supply cables consists of periodic inspections, testing and minor adjustments. Most work is carried out at the terminals. A "locating" service is provided to advise anyone who is excavating near the cable of the exact location of the cable. In case of a cable failure, an enclosed area of approximately 11 m (35 ft.) x 3 m (10 ft.) may be required over the affected cable section for approximately two weeks while repairs are made.

5.12 MUNICIPAL APPROVALS

The proposal for improvements at London-Nelson TS and for the construction of a new "Central" transformer station and associated supply cables was endorsed by the "Land Use" and the "Environment and Protective Services" Committees of London City Council on May 30, 1977 and by Council as a whole on June 6, 1977. A copy of a letter from the City Clerk to Mr. A.C. McDermid dated June 7, 1977 advising of Council's position is included in Appendix 4. A copy of a letter to Mrs. Barbara Chapin dated June 7, 1977 concerning energy conservation is also included in this appendix.

NOTES:

- MEASUREMENTS TO BE VERIFIED ON SITE.
- FOR FURTHER DEFINITION OF FENCING DETAILS - SEE DWG NO. MW13-XF-15400-4
- TREES TO BE ADJUSTED ON SITE.
- PLANTING OF TREES ON RAILWAY R/W SUBJECT TO AUTHORIZATION

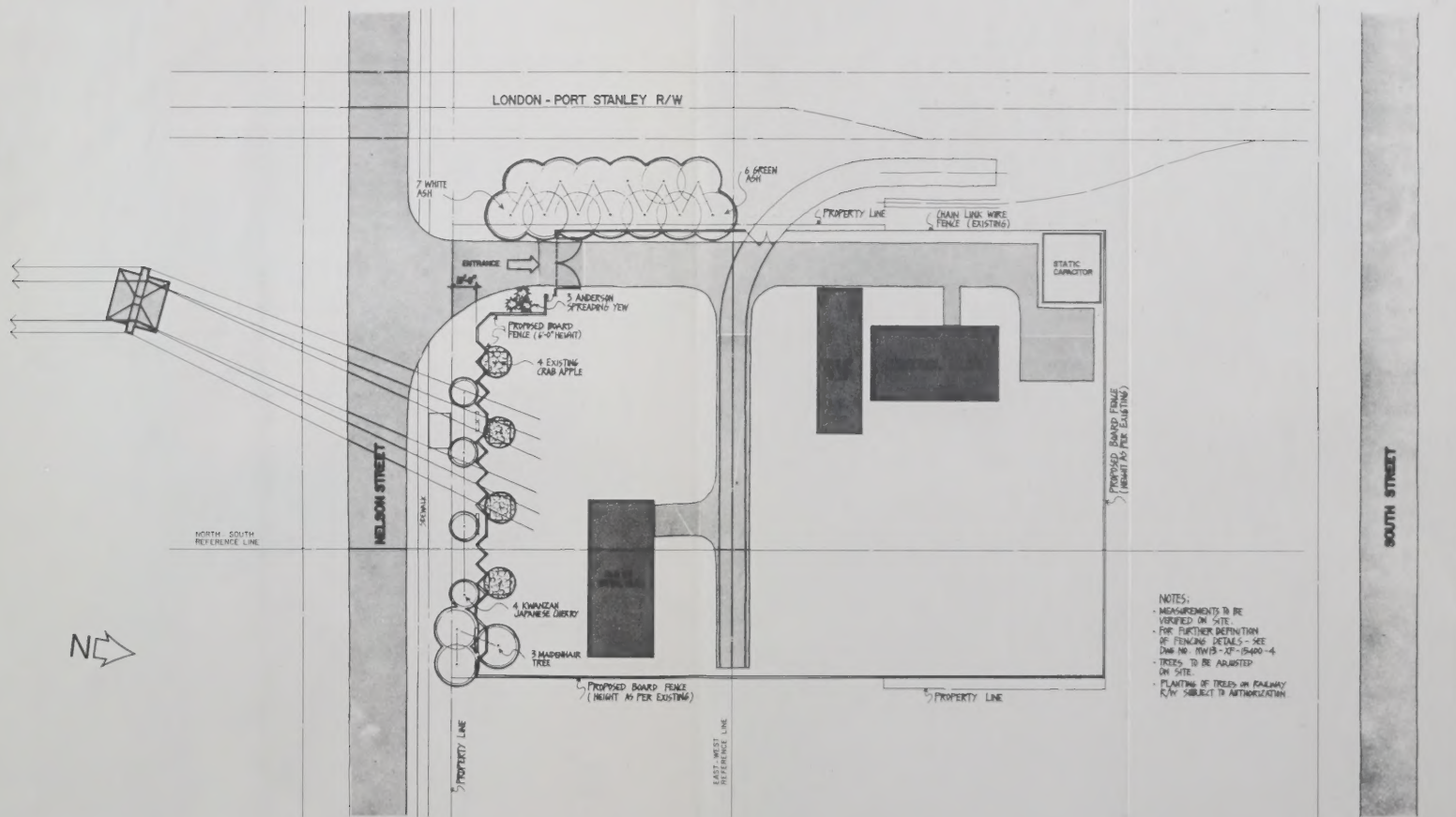
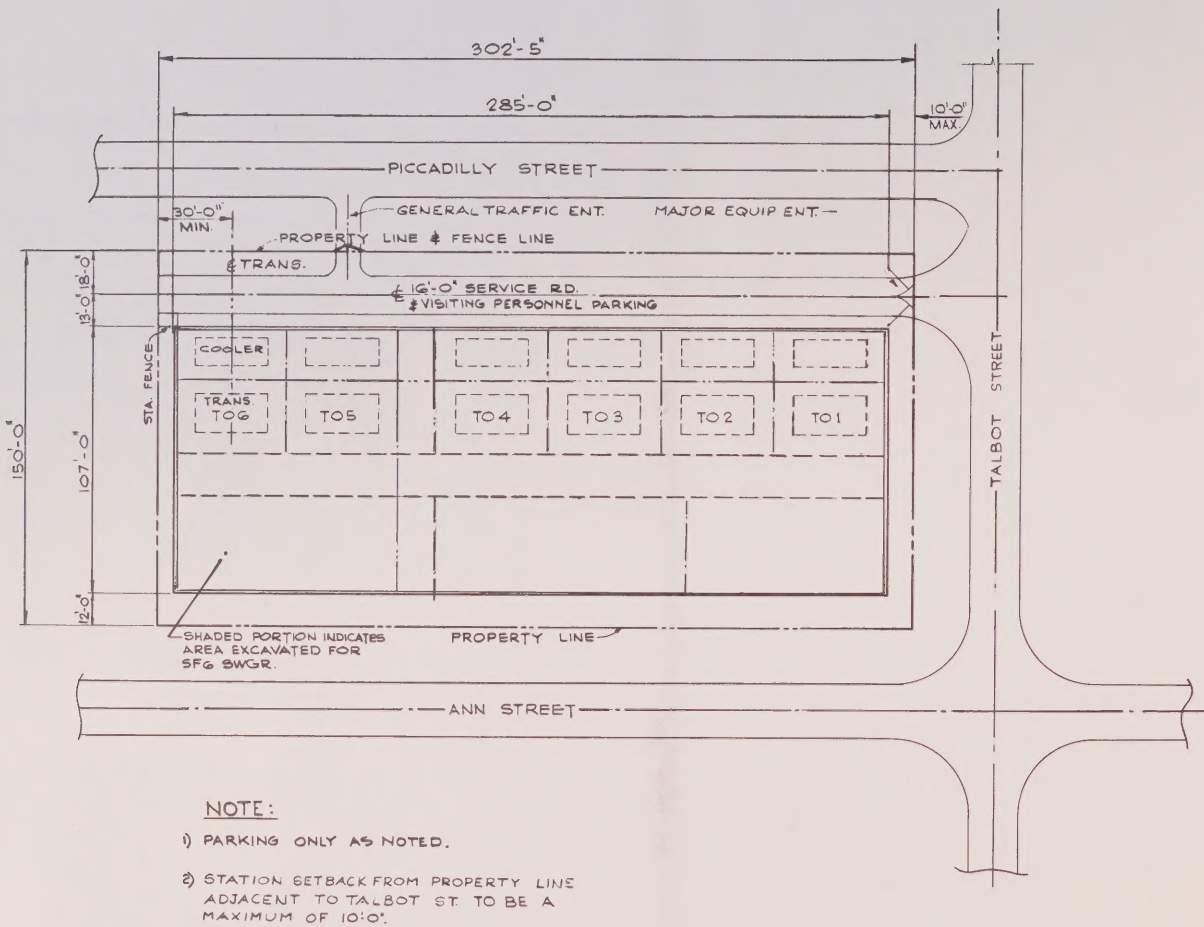
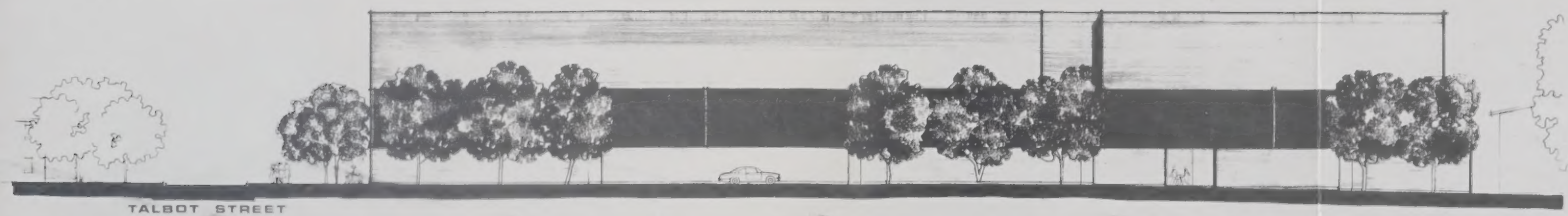
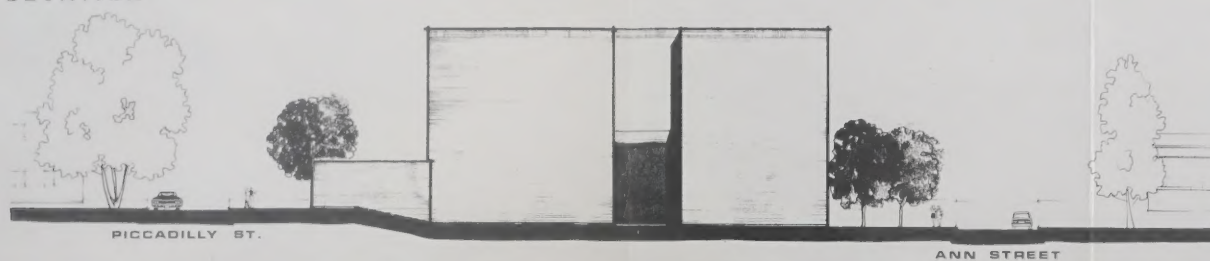


Figure 20 Proposed 230-27.6-13.8 kV station arrangement





WEST ELEVATION



SOUTH ELEVATION



EAST ELEVATION

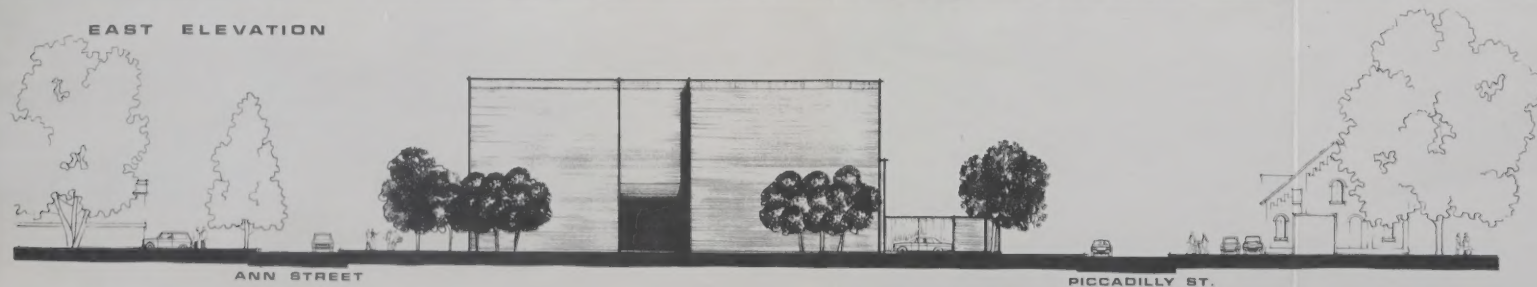
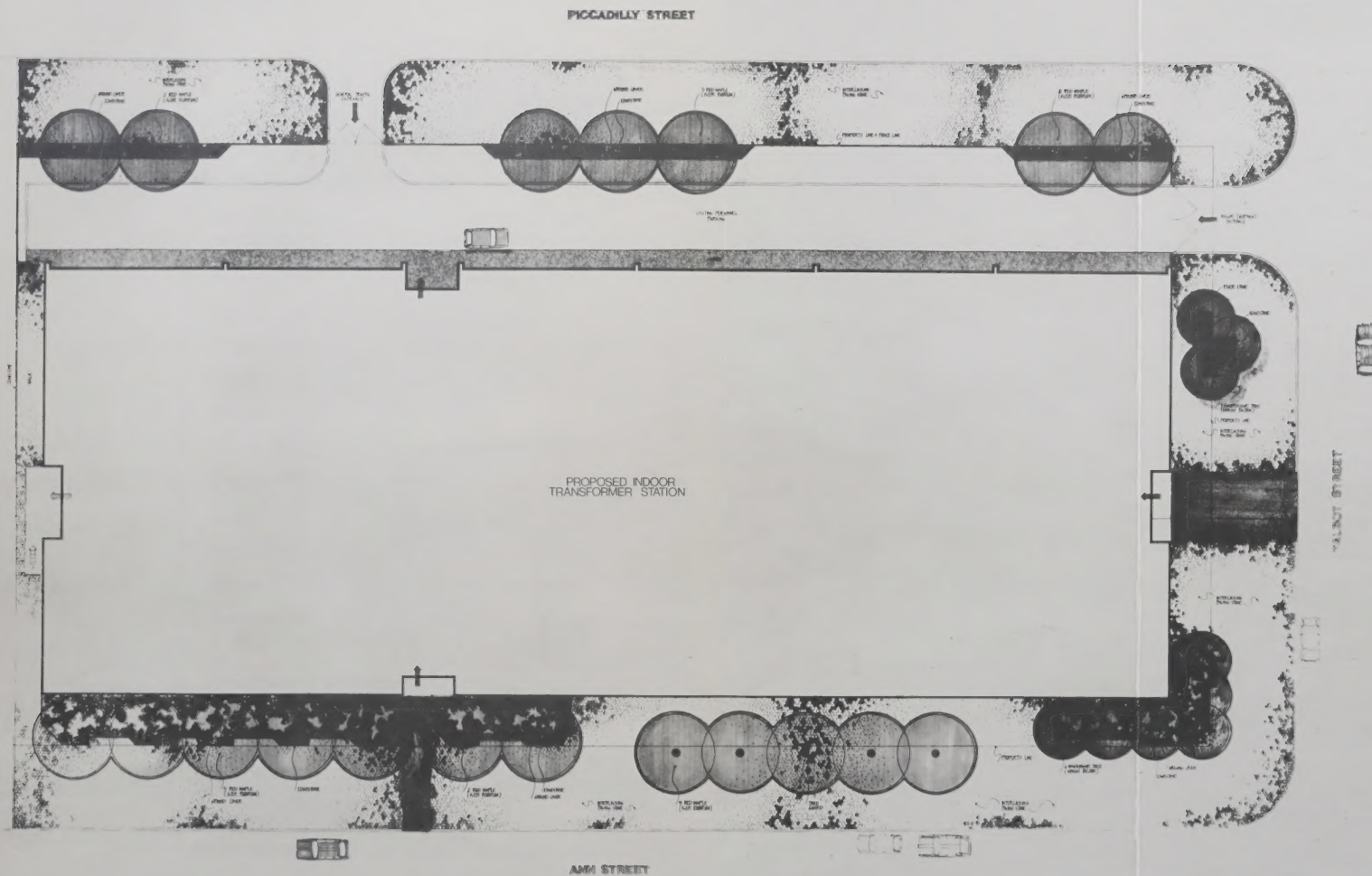


Figure 22 Proposed landscape plan for new TS



Appendix 1

Examples of advertisements and flyers

NEW TRANSFORMER STATION IN CENTRAL LONDON

INFORMATION CENTRES

Participate in selecting the site for a new Ontario Hydro transformer station in central London, in the area bounded by Oxford St., Adelaide St., York St., and the Thames river. You are invited to one of the following information centres:

NORTH LONDON

Trinity Lutheran Church
746 Colborne Street
1:00-10:00 p.m.

TUESDAY, MAY 25

LORNE AVENUE

Lorne Avenue Community School
723 Lorne Avenue
1:00-9:00 p.m.

WEDNESDAY, MAY 26

CENTRAL LONDON

Lord Roberts Community School
440 Princess Avenue
1:00-10:00 p.m.

THURSDAY, MAY 27

TALBOT

London Labour Hall
133 Kent Street
10:00 a.m.-10:00 p.m.

MONDAY, MAY 31

NELSON

St. John's Community School
449 Hill Street
1:00-9:30 p.m.

TUESDAY, JUNE 1

A committee of representatives from community associations, public interest groups, municipal government, the London PUC and Ontario Hydro have reviewed the need for a new transformer station and identified alternative means of meeting that need.

Before proceeding with the preliminary selection of possible station sites and the necessary power line routes the committee wants the public to contribute its comments and ideas.



Plan to attend Public Information Centres
in your area:

North London
Tuesday, May 25, 1976

Trinity Lutheran Church
746 Colborne Street
1:00 - 10:00 p.m.

Lorne Avenue

Wednesday, May 26, 1976
Lorne Avenue Community School
723 Lorne Avenue
1:00 - 9:00 p.m.

Central London

Thursday, May 27, 1976
Lord Roberts Community School
440 Princess Avenue
1:00 - 10:00 p.m.

Talbot

Monday, May 31, 1976
London Labour Hall
133 Kent Street
10:00 a.m. - 10:00 p.m.

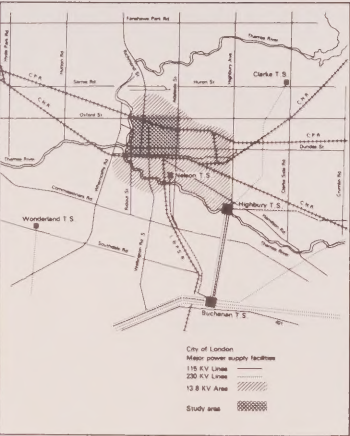
Nelson

Tuesday, June 1, 1976
St. John's Community School
449 Hill Street
1:00 - 9:30 p.m.

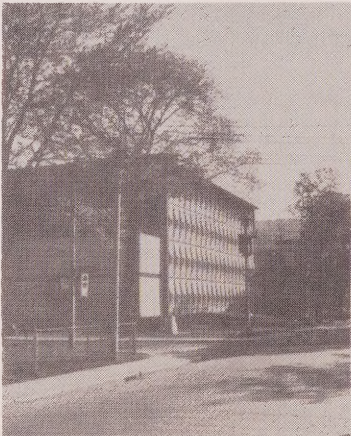
Working Committee

Name	Organization	Phone
Mr. Jack Boitson	Ontario Hydro	681-1390-ext. 471
Mr. Mike Krpan	Ontario Hydro	(Toronto)
Mr. Ken Buller	Ontario Hydro	(Toronto)
Mr. Paul Vyrostko	Ontario Hydro	681-1390-ext. 338
Mr. Bob Swim	London PUC	679-5597
Mr. Stuart Robb	Chamber of Commerce	472-1306
Mrs. Barbara Chapin	North London Community Association	433-0502
Mrs. Ormah Gibson	Urban League	471-1858
Mr. Dan Link	Citizen	453-7230-ext. 248
Mr. Bruce Wright	Talbot Community Association	432-5635
Mr. Paul Newall	North East Central London Community Association	438-2558
Mrs. Hazel Holden	Consumer's Association of Canada	451-1423
Mr. Doug Little	Lorne Avenue Community Council	672-1955
Mrs. Mardelle Bishop	Pollution Probe London	672-3878
Mrs. Elaine Hagarty	(Ex Officio) Alderman	432-9939
Mrs. Kevin Garland	A.J. Diamond Associates	Consultant

London Study: Electrical supply as it affects you...



London's existing power supply system



Typical enclosed transformer station

London's bursting its seams. Especially the central (Downtown) area. New high-rise apartments, hotels, business and office buildings are changing London. Then there's the population increase, especially in Northwest London. Whether we like the idea of this growth or not, it all adds up to the need for more hydro.

To find solutions to the present and near future demands for electricity, a committee of representatives from community associations, public interest groups, the PUC, Ontario Hydro, and the city has set to work.

To meet the immediate need, the committee has recommended an upgrading of the Nelson Street and Clarke Road Transformer Stations. To meet the

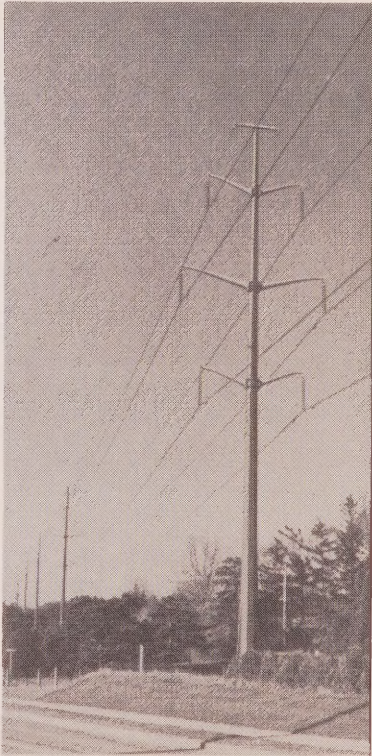
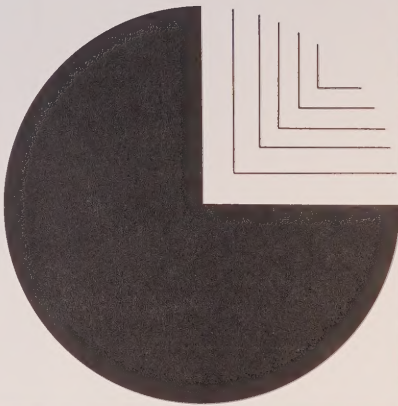
future need, the committee is looking at two basic alternatives:

(1) A major expansion of the Nelson St. station
(2) A new transformer station in the Central area

To find the best solution, the following is being considered:

- the need for more hydro
- possible sites for a new station
- possible routes for a transmission line
- how it affects you; safety, appearance, reliability, cost, effects on the neighbourhood, etc.

What do you think? The committee wants to hear from you at its public information centres.



Modern above-ground power line

Appendix 2

Working Committee recommendations

London-Nelson TS

"Moved that the Working Committee recommends that Ontario Hydro enter into a site development agreement with the City of London to:

- (a) Construct a wood fence on the North, South and East sides of the Nelson station (six feet high) and plant trees on the south side. This work is to be completed not later than December 31, 1978.
- (b) Take whatever measures are necessary to reduce the sound levels at the fence line of the Nelson Transformer Station to less than 50 dbA. This work is to be completed as soon as practical after a decision is made concerning the need to increase the capacity of the station and not later than December 31, 1981."

Moved by: Barbara Chapin, Second by: Mike Krpan. The resolution was carried unanimously.

New Central Transformer Station:

The Working Committee passed the following resolutions:

"Moved that the Working Committee recommends the site on the west side of Talbot Street between Piccadilly and Ann Streets for the new Central Transformer Station. That further, Ontario Hydro enter into a site development agreement with the City to undertake landscape treatment of comparable quality to that shown on drawing NW401-XF-15400-1 (Figure 22 in this report) and architectural treatment to the satisfaction of the city."

Moved by: Ormah Gibson, Second by: Mardelle Bishop, the resolution was carried unanimously.

Transmission Supply to the New Central TS:

"Moved that the transmission supply line to the New Central Transformer Station be a combination of overhead line along the CP rail corridor from Second Street terminating in the vicinity of Quebec Street and underground circuits along city streets from there to the new station".

Moved by: Bob Swim, Second by: Stuart Robb. In favour: Bob Swim, Stuart Robb, Barb Chapin, Mardelle Bishop, Paul Newall

Opposed: Bruce Wright, Ormah Gibson.

The committee also voiced strong support for energy conservation and passed the following resolution:

Resolved that the Working Committee wishes to commend Ontario Hydro, the City of London, and the London Public Utilities Commission for their constructive steps to date in encouraging energy conservation measures in both the public and private sectors. However in view of the rapidly escalating costs of providing for the growth in consumption of electrical energy in the City of London, the Committee recommends that all development applications brought before the City of London be accompanied by a statement from the proponent demonstrating that serious consideration has been given to the efficient use of electrical energy. Such statements shall be reviewed by the P.U.C. to ensure that the most efficient use is made of London's existing energy transmission system."

Appendix 3

Health, safety and nuisance considerations

Transformer stations carry large amounts of power at high voltages. Although they help supply the energy that makes our lives more productive, comfortable and safe, there are a number of health, safety and nuisance aspects that must be considered. The following is a brief explanation of a number of areas of concern.

(a) Fire

Transformer stations contain very little combustible material. However, the transformers are filled with oil which serves as an electrical insulator and coolant. The type of oil used does not ignite easily and it is rare to have a fire in a transformer station. In an enclosed station such as would be used in central London, an automatic system would immediately deluge the fire with large amounts of water. A fire alarm would be sounded automatically.

(b) Noise

Transformers produce a continuous "hum". Also the fans used for cooling produce some noise when they are in operation. Circuit breakers produce a "bang" when they operate. The transformers and circuit breakers will be located inside a building and measures will be taken so that the noise will not annoy nearby residents. The fans and oil cooling radiators are located outdoors, but since the fans usually operate only in emergencies, they normally do not present a problem.

(c) Access to Transformer Stations

Access to an enclosed transformer station is only possible through doors which are normally locked. Entry into the station causes an alarm at the controlling station.

(d) Sulphur Hexafluoride

Sulphur Hexafluoride (SF₆) gas is a well known industrial gas and is sometimes used as an electrical insulator. It permits major savings in the space needed for switching stations. The gas is chemically inert, non-toxic, non-flammable and non-corrosive. When exposed to an electric arc, some of the gas is decomposed. The decomposition products are normally absorbed by chemicals in the equipment. In the event of an accident which permitted these products to escape into the atmosphere, the concentration would be a far less serious environmental pollutant than say the exhaust from cars passing on the street.

There will be some SF₆ gas used in the proposed London transformer station initially. Additional equipment which uses the SF₆ gas may be installed in the future.

(e) Polychlorinated Biphenols (PCB)

PCB compounds may be used in some equipment which may be installed in the transformer station in the future but this is unlikely since suitable substitutes are now becoming available. Provision is made to catch any leakage of this liquid and to dispose of it in approved disposal facilities.

(f) Oil Spills

Any oil spills that might occur in the transformer station would be trapped in the building and pumped into a truck for removal.

(g) Traffic

A transformer station normally generates very little traffic. The amount of traffic generated would probably be less than that produced by an average residence.

Appendix 4
Letters from the City Clerk

THE CITY OF LONDON, ONTARIO, CANADA



W. S. ROSS, B.A., City Clerk

P. C. McNORGAN, A.M.C.T., Deputy City Clerk

300 Dufferin Avenue
P.O. Box 5035, London N6A 4L9
Telephone 679-4530

DEPARTMENT OF THE CITY CLERK

June 7, 1977

Mr. A. C. McDermid
Supervising Site Planner
Ontario Hydro
700 University Avenue
Toronto, Ontario
M5G 1X6

I hereby certify that the Municipal Council, at its session held on June 6, 1977 resolved:

6. That the following Ontario Hydro proposals developed to implement methods to increase the supply of electrical energy to Central London be accepted and endorsed:

(a) London Nelson Transformer Station

Ontario Hydro's proposal to enter into a site development agreement with the City of London to:

- (i) provide for improvements to the appearance of the station to be implemented not later than December 31, 1978 as shown on Drawing NW13-XF-15400-3 (attached) and
- (ii) provide for acoustical treatment of the station to reduce the level of sound originating from the transformers and measured at the station property line to below 50 dBA, the timing for implementing this treatment to be dependent upon the need for upgrading the station capacity, but in any event the work to be carried out no later than December 31, 1981;

(b) Proposed New "London Central Transformer Station" Site

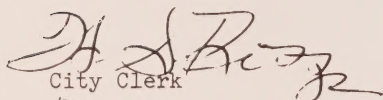
Ontario Hydro's proposal to acquire a site located on the west side of Talbot Street, between Piccadilly and Ann Streets as a location for a future transformer station supplying electric power at 13,800 volts to the central area and at 27,600 volts to north-west London, on the understanding

that Ontario Hydro will be required to enter into a site development agreement with the City prior to the building of this station, such agreement to specify detailed siting of the building, access and service entrances, and landscaping treatment equal in quality to the conceptual landscape design indicated by Drawing NW401-XF-15400-1 (attached);

(c) Proposed Underground Transmission Line to Supply "London Central Transformer Station"

Ontario Hydro's proposal to construct two separate underground transmission lines, one in the vicinity of Dundas Street and the other in the vicinity of Oxford Street both at junctions on Second Street and along City road allowances to the transformer station site on Talbot Street, on the understanding that negotiations will be carried out between Ontario Hydro and the City Engineer in order to determine which City road allowances would be best suited to the routing of these transmission lines;

(d) That the Planning Division be directed to take into consideration the concerns of local residents who will be affected by Ontario Hydro's proposals for increasing the supply of electrical energy to Central London at the time the site development agreements are being negotiated between the City and Ontario Hydro. (38.7.1.) (6/10/EPSC) (AS AMENDED)


City Clerk
/bs

- c.c. L. E. Draho, Acting Director of Planning
M. E. MacLean, Chief Administrative Officer
D. J. Date, Finance Commissioner
A. K. Rowntree, City Engineer
M. C. Engels, Commissioner of Community Services
A. L. Furanna, General Manager. P.U.C.
St. John's Community School Neighbourhood Council, 449 Hill Street,
London N6B 1E5
Mrs. K. Garland, A. J. Diamond Associates, 322 King Street West,
Toronto M5V 1J4
Mrs. B. Chapin, 363 Cheapside Street, London

THE CITY OF LONDON, ONTARIO, CANADA

W. S. ROSS, B.A., City Clerk

P. C. McNORGAN, A.M.C.T., Deputy City Clerk



300 Dufferin Avenue
P.O. Box 5035, London N6A 4L9
Telephone 679-4530

DEPARTMENT OF THE CITY CLERK

June 7, 1977

Mrs. Barbara Chapin
Co-Chairman
Ontario Hydro Working Committee
363 Cheapside Street
London, Ontario
N5Y 3W8

I hereby certify that the Municipal Council, at its session held on June 6, 1977 resolved:

7. That the following recommendation from the Ontario Hydro Working Committee established to develop proposals for the supply of electrical energy to Central London be reviewed by the Public Utilities Commission and reported to the Land Use and Development Committee:

"That all development applications brought before the City of London be accompanied by a statement from the proponent demonstrating that serious consideration has been given to the efficient use of electrical energy, and that such statements be reviewed by the Public Utilities Commission to ensure that the most efficient use is made of London's existing energy transmission system." (38.7.1.) (7/10/EPSC) (AS AMENDED)


City Clerk
/bs

c.c. M. E. MacLean, Chief Administrative Officer
M. C. Engels, Commissioner of Community Services
L. E. Draho, Acting Director of Planning
A. K. Rowntree, City Engineer
Mr. A. C. McDermid, Supervising Site Planner, Ontario Hydro,
700 University Avenue, Toronto M5G 1X6
A. L. Furanna, General Manager, P.U.C.

Sept

AUTHOR		
TITLE		
DATE DUE	BORROWER'S NAME	DATE RET'D

Environmental Studies

UNIVERSITY OF TORONTO
INSTITUTE FOR ENVIRONMENTAL STUDIES

Environmental Studies
Sept

